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AN ANNOTATED BIBLIOGRAPHY OF PATENTS RELATED TO COASTAL ENGINEER--ETC(U)

NOV 79 R E RAY, M D DICKEY, A M LYLES

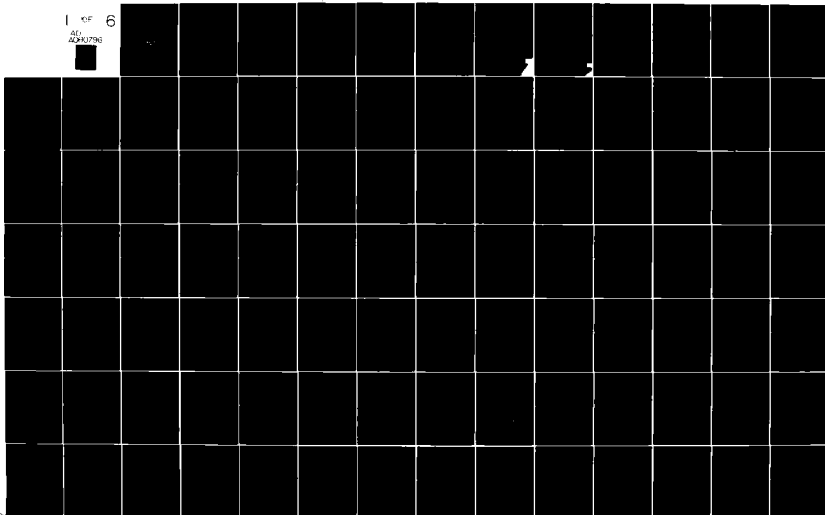
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(6) **An Annotated Bibliography of Patents
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1971-1973, Appendix

by

(10) Robert E. Ray, Michael D. Dickey and Annie M. Lyles

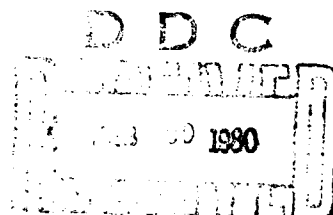
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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This appendix presents a three-volume collection of patents on coastal engineering issued by the U.S. Patent Office from 1967 to 1976. Topics include coastal structures and structural components, structure protection and maintenance, construction methods and equipment, field research and survey instruments, hydraulic laboratory modeling equipment, marine pollution control apparatus, and ocean energy extraction devices. Abstracts and annotations for 2,468 patents are given in the three volumes covering the periods 1967 to 1970 (Vol. I), 1971 to 1973 (Vol. II), and 1974 to 1976 (Vol. III). Also included in each volume are a list of patent titles and numbers, and an index by keywords. Explanatory information on the overall collection and its use, abstracted from MR 79-6, is given in Volume I.		

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VOLUME II: 1971-73

by
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and
Annie M. Lyles

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3552209 LIQUID LEVEL INDICATORS
3552424 FLOATING LIFT STATION
3553922 GLUED-LAMINAE PILE
3553969 SUBMERGED OIL STORAGE STRUCTURE
3553970 INFLATABLE CLAMPING DEVICE
3554009 METHOD AND DEVICE FOR DETERMINING THE QUANTITY OF DREDGING SPOIL TO BE PAID
3554010 METHOD AND SUCTION DREDGING INSTALLATIONS FOR CONVEYING DREDGING SPOIL
3554011 METHOD AND DEVICE FOR DETERMINING THE CONVEY CONCENTRATION OF DREDGING SPOIL OF A SUSPENSION OF DREDGING SPOIL AND WATER
3554290 OIL POLLUTION CONTROL AND FIPE EXTINGUISHING APPARATUS AND METHOD
3555831 COMPOSITE FOUNDATION MEMBER AND METHOD
3555832 FENDER
3556035 SAILING VESSEL
3556210 DEEP SEA WELL DRILLING STRUCTURE
3556301 FLOATING FLEXIBLE SKIMMING DEVICES
3557559 WAVE-GENERATING APPARATUS
3557960 OIL SKIMMING APPARATUS
3559223 LONG SPAR BUOY CONSTRUCTION AND MOORING METHOD
3559407 ARTIFICIAL SEAWEED
3559410 SYSTEM FOR RELIEVING STRESS AT THE TOP AND BOTTOM OF VERTICAL TUBULAR MEMBERS IN VERTICALLY MOORED PLATFORMS
3559607 MULTIPLE RETRIEVAL SYSTEM FOR OBJECTS IN SUBMARINE ENVIRONMENT
3559762 SAFETY LADDER FOR WATER USE
3560912 CONTROL SYSTEM FOR A TOWED VEHICLE
3561219 TEXTILE MAT FOR INDUSTRIAL USE IN THE FIELD OF CIVIL ENGINEERING
3561220 METHOD AND APPARATUS FOR CONTAINING WELL POLLUTANTS
3561267 BATHYTHERMOMETER
3561268 EXPENDABLE BATHYTHERMOGRAPH
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3561546 METHOD OF AND APPARATUS FOR UNDERWATER GEOCHEMICAL EXPLORATION
3561547 BOTTOM SAMPLER
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3562917 APPARATUS FOR MEASURING IRREGULAR SURFACES OF DEPOSITS OF CONCRETE BLOCKS OR RUBBLE MOUNDS
3563036 INFLATABLE FLOATING BOOMS
3563037 MINIMIZING SCOURING ACTION IN WATER FLOW CHANNELS
3563041 OFF-SHORE SHIP MOORING INSTALLATION
3563334 SEISMIC SOURCE FOR USE WHILE SUBMERGED IN A LIQUID MEDIUM
3563607 SUBAQUEOUS MINING
3564490 METHOD AND MEANS FOR MEASURING DEPTH OF WATER OR THE LIKE
3564492 DEVICES FOR EMITTING ACOUSTIC WAVES IN A LIQUID MEDIUM
3564852 FLEXIBLE FLOATING BOOMS
3564853 METHOD OF CONTROLLING EROSION ON SEASHORES
3564856 PROCESS AND APPARATUS FOR CEMENTING OFFSHORE SUPPORT MEMBERS
3564858 BOAT LANDING FOR OFFSHORE STRUCTURE
3565254 APPARATUS FOR CONFINING A SLICK AND COLLECTING OIL THEREFROM
3565257 FLOATING BARRIER FOR WATER POLLUTANTS
3565491 JET PUMP METHOD AND SYSTEM
3565672 METHOD OF IMPROVING RESISTANCE TO CORROSION OF METAL SURFACE AND RESULTANT ARTICLE
3566426 FLOTATION SYSTEM
3567019 OIL LEAKAGE BARRIER
3567953 TIDE-OPERATED POWER PLANT
3568449 CONSTRUCTION OF LAND MASSES BOUNDED BY WATER
3568451 PORTABLE DOCK
3568454 APPARATUS FOR WORKING UNDER WATER
3568622 EXPLOSIVE ANCHOR FIRING DEVICE
3569725 WAVE-ACTUATED POWER GENERATOR-BUOY
3570252 CONSTRUCTIONAL WORKS
3570253 CONSTRUCTIONAL WORKS
3570254 METHOD AND MEANS FOR PROTECTING AN EARTH SURFACE AGAINST SCOUR
3570256 INFLATABLE BERTH

3570257 DOCK AND DOLPHIN PROTECTOR
 3570437 MULTI-CYCLE OCEAN DATA GATHERING SYSTEM
 3572042 PROCESS FOR FORMING A PLASTIC FILL SHEET OF OCEAN FLOOR SILT
 3572043 UNDERWATER STRUCTURE
 3572044 MULTIUNIT OFFSHORE PLATFORM
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 3572129 FREE-FALL BOTTOM SAMPLER
 3572462 APPARATUS FOR AND METHOD OF SEISMIC EXPLORATION
 3572506 UNDERWATER STORAGE TANK
 3572833 PROCESS FOR EXCAVATION OF HARD UNDERWATER BEDS
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 3575005 METHOD AND APPARATUS FOR OFFSHORE OPERATIONS
 3576108 MARINE OIL BOOM
 3576111 UNDERWATER PIPELINE-BURYING APPARATUS
 3576220 TELESCOPING SEA FLOOR SOIL SAMPLER
 3576257 FLUID SEPARATION DEVICE
 3577340 METHOD FOR DISPERSING OIL SPILLS ON WATER
 3577738 APPARATUS FOR INJECTING SAND BENEATH SUBMERGED CONSTRUCTIONS
 3577879 FLOATING BARRIER MEANS
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 3581508 UPLIFT PILE ANCHORAGE STRUCTURE
 3581694 LONGITUDINALLY SPLIT BARGES WHICH ARE INTERCONNECTED BY MEANS OF HINGES
 3581899 APPARATUS FOR SEPARATING OIL FROM WATER SURFACE
 3582034 MOLD FOR CASTING A BREAKWATER CONCRETE BLOCK
 3583170 SUBMERGED PIPELINE ENTRENCHING APPARATUS AND CONTROL SYSTEMS FOR SAME
 3583497 AN IMPROVED VIBRATING POWER HAMMER FOR DRIVING AND EXTRACTING PILES
 3583499 HYDRAULIC PILE EXTRACTOR
 3584462 APPARATUS FOR GATHERING AND CLEANING WATER SURFACES OF POLLUTION
 3584464 INFLATABLE MARINE FENDER
 3585579 SIDE LOOKING SONAR TRANSDUCER
 3585738 METHOD AND APPARATUS FOR SUCTION DREDGING
 3585739 METHOD AND SUCTION DREDGING INSTALLATION FOR OBTAINING SAND
 3585740 METHOD AND SUCTION DREDGING INSTALLATION FOR SUCKING UP DREDGING SPOIL
 3585801 OFFSHORE TOWER
 3585802 DOCKING AND FENDERING SYSTEM
 3585803 PILE SPLICE
 3585952 SELF RIGHTING VESSEL
 3586469 PROCESS OF BURNING-OFF OIL ON THE SURFACE OF WATER BASINS
 3587308 WATER WAVE MONITOR
 3587309 AERO-HYDRO INTERFACE MEASURING SYSTEM
 3587310 HOLLOW CORE INSTRUMENT CABLE
 3587503 MEANS FOR CONSTRUCTING BUOYANT PLATFORMS
 3587874 BOAT-SUPPORTING AND LAUNCHING DEVICE
 3588795 DEPTH INDICATOR
 3589040 MECHANISM FOR ANTICIPATING THE CONCENTRATION OF SAND
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 3589133 METHOD OF AND MEANS FOR MOUNTING EQUIPMENT AT A SUBSEA LOCATION
 3590406 LONG SPAR BUOY
 3590408 ANCHORING DEVICE FOR A FLOATING BUOY
 3590584 FLOATING OIL CONFINING APPARATUS
 3590585 COMPOSITE STRUCTURE
 3590587 FLOATING PLATFORM WITH HORIZONTALLY MOVABLE COLUMNS
 3590589 APPARATUS FOR BURYING PIPELINES
 3590635 PYCNOCLINE FOLLOWER APPARATUS
 3591936 SUBMARINE CUTTER DREDGER
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 3592006 ISOLATION DEVICE
 3592007 RETAINER FOR FLOATING DEBRIS

3592008 FLOTATION CONFINEMENT APPARATUS
 3592012 Laterally Reinforced Offshore Platform
 3592013 TILTING JACK OFFSHORE PLATFORM
 3592286 METHOD OF SEISMIC PROSPECTING
 3593526 APPARATUS AND METHODS FOR OIL SLICK CONTAINMENT
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 3593530 MARINE PLATFORM WITH REMOVAL COLUMN CLAMPS
 3593531 MARINE FENDER
 3593532 CONCRETE PILE SECTIONS AND JOINTS THEREFOR
 3593533 UNDERWATER COLLECTING AND LIFTING DEVICE
 3595026 BREAKWATER
 3595189 WAVE-ACTUATED LOAD COMPENSATOR
 3595196 FLOATING PLATFORM FOR VESSEL MOORING
 3595257 VACUUM FILLING PROCESS AND SYSTEM FOR LIQUID-FILLED MARINE
 SEISMIC CABLES
 3595324 PILE DRIVERS INCLUDING MULTIPLE HAMMERS WITH COMMON ANVILS
 3596070 WINCH CONTROL SYSTEM FOR CONSTANT LOAD DEPTH
 3596512 EXPENDABLE AIR PROBE
 3596621 LONGITUDINALLY SPLIT AND HINGED BARGE
 3597778 MOORING DEVICES
 3597924 FLOATING OIL BARRIER AND METHOD OF CONTAINING A FLOATING SUBSTANCE
 3597928 EROSION CONTROL
 3597930 METHOD AND APPARATUS FOR REINFORCING IN SITU IN PILE CASING
 3597931 ANCHORAGE SYSTEM AND METHOD OF USE
 3598505 BELLOWS PUMP
 3598729 METHOD OF REMOVING OIL SLICKS FROM WATER SURFACES
 3599020 APPARATUS FOR DETECTING AND MEASURING CREVICE CORROSION
 3599354 APPARATUS FOR REMOVING WEEDS FROM SOIL UNDER WATER
 3599383 PILE-AND-CONCRETE CONNECTOR
 3599434 DEVICE FOR CONFINING OIL RELEASED BY LEAKAGE DURING OFFSHORE
 OIL DRILLING OPERATIONS
 3599590 FLOATING OIL-RECOVERY SUMP
 3600832 PIVOTED CUTTER AND CONTROL FOR HYDRAULIC DREDGE
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 3603426 APPARATUS FOR MARINE SEISMOGRAPHIC PROSPECTING
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 3648463 FLOATING BOOM FOR OIL-SOAKED MATERIAL
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 3648466 ELEVATED RESERVOIR FOR USE WITH OFF-SHORE OIL WELLS
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 3648637 HOPPER BARGE DRIVABLE WITH A DRIVING MEANS
 3648642 COMMUNICATION CHANNEL BETWEEN BOAT AND MARINE CABLE DEPTH CONTROLLERS
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 3650415 ARRANGEMENT FOR UNLOADING MATERIAL FROM A DREDGE
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 3651653 SECTIONAL PILE AND COUPLING MEANS
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 3651943 POLLUTION SUCTION WATER SWEEPER
 3652439 APPARATUS FOR MEASURING PH IN HIGH-PRESSURE ENVIRONMENTS
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 3750408 PROCESS FOR THE CONTINUOUS DREDGING OF INCOHERENT MATERIAL,
 PARTICULARLY SANDY MATERIAL, WITH A CIRCULAR PATH
 3750412 METHOD OF FORMING AND MAINTAINING OFFSHORE ICE STRUCTURES
 3750609 POWERFUL THRUSTER METHOD AND APPARATUS SUITABLE FOR DRIVING A MEMBER
 SUCH AS AN ANCHOR OR PILE INTO THE EARTH, AND ANCHORING
 AND PILE APPARATUS

3750837 EXPLOSIVE SEISMIC ENERGY SOURCE WITH QUICK RELEASE VALVE
 3751925 FLOATING OIL CONTAINMENT BOOM
 3751927 APPARATUS FOR ENTRENCHING SUBMERGED ELONGATE STRUCTURES
 3751930 ARTICULATED MARINE STRUCTURE WITH PREPOSITIONED ANCHORING PILES
 3752102 FLOATING DOCK OR THE LIKE AND FLOATATION UNIT FOR USE THEREWITH
 3752317 OIL RECOVERY VESSEL
 3753354 CORROSION-PROTECTED ANCHORING RODS FOR ANCHORING STRUCTURAL PARTS
 IN THE EARTH, AS WELL AS METHOD OF PRODUCING ANCHORINGS WITH
 CORROSION-PROTECTED ANCHOR RODS
 3753355 LIFTING DRY DOCK
 3753494 UNDER-SEA OIL STORAGE INSTALLATION
 3753496 CONVERGING VORTEX APPARATUS FOR SEPARATING OIL FROM WATER
 3753497 POLLUTION SKIMMER
 3754403 OFFSHORE MARINE STRUCTURE EMBODYING ANCHOR PILE MEANS
 3754439 OCEANOLOGICAL AND METEOROLOGICAL STATION
 3754653 APPARATUS AND METHOD FOR COLLECTION OF OIL FROM SURFACE OF THE SEA
 3755189 COMPOSITION FOR THE CONTROL OF OILS FLOATING ON WATER
 3755932 JACK-UP DREDGE
 3756031 SELF-RIGHTING FLOATING BOOMS
 3756032 SLUICEGATE STRUCTURE
 3756033 OFFSHORE STRUCTURE WITH ROTATING AND INDEXING MECHANISM
 FOR PLACING PILES
 3756294 UNDERWATER LEAKAGE OIL COLLECTOR SYSTEM
 3756414 OIL SKIMMER MODULE
 3756659 SUCTION DREDGING INSTALLATION
 3757287 SEA BOTTOM CLASSIFIER
 3757369 PIPELINE WITH FLOATS
 3757438 BULLDOZER FOR UNDERWATER OPERATIONS
 3757526 FLOATING BOOM STRUCTURES
 3757527 WAVE DEFLECTING DEVICE FOR A SEA WALL
 3757953 DECANTING SKIMMER
 3758788 CONVERSION SYSTEM FOR PROVIDING USEFUL ENERGY
 FROM WATER SURFACE MOTION
 3759043 HOLDS FOR USE IN MANUFACTURING ENERGY DISSIPATING CONCRETE BLOCKS
 FOR RIVER AND MARINE WORKS
 3759045 MONOMOORING SEA PLATFORM
 3759046 MOVEMENT OF MARINE STRUCTURES IN SALINE ICE
 3759097 ELECTROMAGNETIC WATER CURRENT METER
 3759390 THE REMOVAL OF SURFACE LAYERS FROM LIQUIDS
 3760518 ROTARY DREDGE CUTTER-HEAD HAVING SPACED GUARD MEMBERS
 3760754 MODULAR UNIT FOR A FLOATING DOCK SYSTEM
 3760761 UNDERWATER KITE DEVICE
 3762078 BENTHIC DREDGE CONSTRUCTION
 3762168 WATER POLLUTION CONTROL
 3762169 FLOATING WATER JET FOR OIL SLICK CONTROL
 3762557 FLOATING SKIMMER
 3762558 ANTI-POLLUTION BARGE AND CONVEYER ASSEMBLY
 3763580 APPARATUS FOR DREDGING IN DEEP OCEAN
 3763653 CUSHIONED DOCK FENDER STRUCTURE AND SHEAR TYPE CUSHION MEMBER
 3763654 PILE DRIVING AND DRAWING APPARATUS
 3763656 PLACING OFFSHORE SUPPORTING ELEMENTS
 3763808 UNIVERSAL MARINE MODULE
 3763816 AUTOMATIC DOCKING SYSTEM
 3764015 APPARATUS FOR CONFINING FLOATING POLLUTANTS
 3765184 DEVICE AND METHOD FOR THE ATTACHMENT OF PIPELINES
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 3765236 APPARATUS FOR RECORDING SWELL FREQUENCY AND PROPAGATION DIRECTION
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 3765923 PROCESS AND COMPOSITION FOR PLAST-CLEANING
 AND CORROSION-PROTECTING METAL SURFACES
 3765933 METHOD FOR THE PROTECTION AGAINST AQUATIC PARASITES
 3766032 METHOD FOR CONTROL OF MARINE FOULING
 3766307 BUOYANT ELECTRICAL CABLES
 3766583 OFFSHORE LIQUEFIED GAS TERMINAL
 3766671 METHOD AND APPARATUS FOR EXCAVATING WITH ENDLESS BUCKET LINE
 3766738 APPARATUS

3766739 OIL SPILLAGE ENCLOSURE SYSTEM FOR MARINE USE
 3766879 APPARATUS FOR COATING UNDER WATER
 3768265 COFFERDAM
 3768266 SHORELINE CONSTRUCTION FOR ARTIFICIAL WATER BODIES
 3768268 DRILLING OR PRODUCTION PLATFORM FOR WORK AT SEA
 3768571 CABLE OPERATED DREDGING SCOOP
 3768656 OIL ACCUMULATOR
 3769802 WALKING LIFT BARGE
 3769803 SUBMERGED STORAGE VESSEL
 3769838 WAVE MEASURING APPARATUS
 3769842 SUBMERSIBLE SAMPLER
 3770080 DEVICE FOR GENERATING ACOUSTIC WAVES BY IMPLOSION
 3770111 CURRENT BELT
 3770627 CONTAINING AND REMOVING OIL SPILLS ON WATER
 3771553 COMPOST FOR REMOVING OIL FILMS FROM WATER
 3771662 OIL RECOVERY SYSTEM
 3772809 METHOD AND SUCTION DREDGING INSTALLATION FOR CONVEYING DREDGING SPOIL
 3773008 FENDER DEVICE FOR SHIPS AND OTHER BOATS
 3773056 JET CLEANING APPARATUS FOR BOATS
 3773550 INHIBITING DEGRADATION AND CORROSION OF SOLID SUBSTRATES
 BY APPLICATION THERETO OF A CURABLE COATING
 OF A POLYEPOXIDE AND AN OXAZINE OR OXAZOLINE
 3774048 ENERGY GENERATING AND STORING ASSEMBLY FOR MARINE STRUCTURE
 3774323 COMPOSITE BUCKET-HYDRAULIC DREDGE
 3774564 CHALNOGRAPHIC VEHICLE AND PLATFORM
 3774570 AUTOMATIC DEPTH CONTROLLER PARAVANE FOR SEISMIC CABLES
 3775737 DEVICE FOR SENSING PRESSURE IN A LIQUID MEDIUM
 3775738 SELECTIVE SEQUENTIAL INPUT SWITCHING METHOD FOR SEISMIC SURVEYING
 3775982 ANTI-POLLUTION BARRIER
 3777372 CUTTER SUCTION DREDGE HAVING PARALLELOGRAM LINKAGE WAVE COMPENSATOR
 3777375 SUCTION DREDGE WITH BRUSH CUTTING ATTACHMENT
 3777376 ARTICULATED LADDER CONSTRUCTION FOR CUTTERHEAD DREDGE
 3777377 METHOD OF COLLECTING SUBMARINE RESOURCES
 3777494 WAVE ENERGY MOTORS
 3777497 STORAGE TANK FOR OFFSHORE STORAGE OF LIQUID AND METHOD OF CONSTRUCTING
 AND INSTALLING SAME
 3777688 METHOD AND APPARATUS FOR EMBLACEMENT OF LONG BEAMS
 IN RUGGED SEA BOTTOM AREAS
 3777689 FLOATING BREAKWATER PONTOON
 3777691 MARINE ELEVATOR
 3779020 IMMERSIBLE OIL FENCE ASSEMBLY
 3779024 STATIONARY STORAGE AND MOORING PLANT RESTING ON THE BOTTOM OF THE SEA
 3779027 METHOD AND APPARATUS FOR A CONTINUOUS DUMBBELL TUBE ANCHORING SYSTEM
 FOR SUBMARINE PIPELINES
 3779192 MODULAR CONCRETE FLOATATION UNIT
 3780690 LINE-POST COUPLINGS AND MARINE MOORING-TOWING DEVICES
 3780975 MEANS FOR PRODUCING CAST-IN-PLACE STRUCTURES IN SITU
 3781775 ROTATING STEREO SONAR MAPPING AND POSITIONING SYSTEM
 3781778 MARINE STREAMER CABLE
 RE27090 INDIVIDUAL DRY DOCK FOR BOATS
 RE27292 APPARATUS FOR SUBMARINE CORE DRILLING
 RE27308 UNDERWATER LOW TEMPERATURE SEPARATION UNIT
 RE27318 DOCK FENDER
 RE27452 FLOATING BOOMS
 RE27460 METHOD FOR ENCASEING RIGID MEMBERS WITH CONCRETE
 RE27526 METHOD AND DEVICE FOR DETERMINING THE CONVEY CONCENTRATION
 OF DREDGING SPOIL OF A SUSPENSION OF DREDGING SPOIL AND WATER
 RE27529 GALVANIC ANODE
 RE27535 METHOD AND DEVICE FOR DETERMINING THE QUANTITY OF DREDGING SPOIL
 TO BE PAID
 RE27536 METHOD AND SUCTION DREDGING INSTALLATIONS FOR CONVEYING DREDGING SPOIL
 RE27640 INFLATABLE FLOAT BOOM

II. ANNOTATED BIBLIOGRAPHY, 1971-73

1. 1971

3,552,131 to 3,630,891

JANUARY 5, 1971

3,552,131

OFFSHORE INSTALLATION

George E. Mott, Metairie, La., and Edison R. Ezekiel, Columbia, S.C., assignors to Texaco Inc., New York, N.Y., a corporation of Delaware

Filed June 24, 1968, Ser. No. 739,422

Int. Cl. E02d 27/38; E02b 3/06

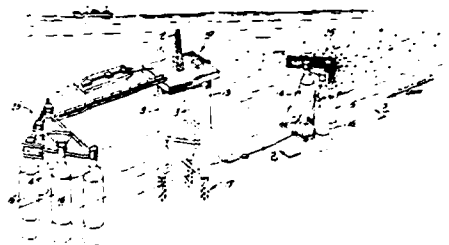
U.S. Cl. 61-46

3 Claims

The invention relates to an installation particularly for the drilling and subsequent production of an offshore oil well from an elevated marine platform. It relates further to means for conveniently storing crude oil on a provisional basis until subsequent transfer to a shore based refining or storage facility. The provisional storage means includes one or more tanks, imbedded in the ocean floor and so arranged remotely from the marine platform to protect the latter from environmental conditions inherent to the location.

Keywords: Collision protection; Ice protection; Offshore platform, fixed; Offshore storage tank, emergent; Offshore structure fender

U.S. Cl. X.R. 61-1; 61-3; 61-4; 220-13



3,552,209

LIQUID LEVEL INDICATORS

James Stewart Johnston, Bognor Regis, England, assignor to Rosemount Engineering Company Limited, Bognor Regis, England, a British company

Continuation-in-part of application Ser. No. 722,461,

Apr. 18, 1968. This application Sept. 8, 1969, Ser.

No. 856,134

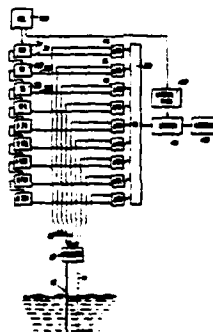
Int. Cl. G01f 23/00

U.S. Cl. 73-304

14 Claims

A liquid level indicator, particularly suitable as a tide gauge, indicates the mean level of a liquid. A number of sensing elements, e.g. capacitive electrodes or conductivity sensors, spaced vertically, sense the presence or absence of liquid at each electrode and give signals which may be converted to a binary digital number indicating the instantaneous level. This digital output signal controls a series of AND gates to pass pulses which, for each gate, are at a rate corresponding to the significance of the appropriate digit. The pulses are non-coincident pulses obtained by dividing down the output of an oscillator. The total number of pulses from all the gates over a predetermined period is fed to a counter which indicates the mean level over that period. By using pulse trains, the level is averaged over a period of time enabling the mean level to be determined to an accuracy better than the electrode spacing.

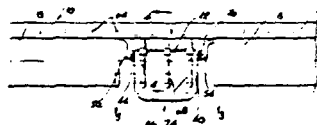
Keywords: Tide measurement



3,552,424
FLOATING LIFT STATION
 Kenneth L. Thompson, Huntington Beach, Calif., assignor to
 Ye Dock Master, Inc., a corporation of California
 Filed Apr. 23, 1969, Ser. No. 818,658
 Int. Cl. F16I 5/00
 U.S. Cl. 137-343 12 Claims

A sewer system for a floating wharf utilizing a floating lift station. Means are provided for gravity feeding sewage from a plurality of floating boat slips to a floating holding tank at the lift station, and means are provided for transferring sewage from the holding tank to a main sewage conduit.

Keywords: Pier, floating; Pollutant collection; Small-craft service structure



JANUARY 12, 1971

3,553,922
GLUED-LAMINAE PILE
 Robert Fred Moore, 1625 3rd Ave., Picayune, Miss.
 39446, and Alvin Edward Moore, 916 Beach Blvd.,
 Waveland, Miss. 39576
 Filed Apr. 22, 1968, Ser. No. 723,213
 Int. Cl. E02d 5/02; E04c 1/10
 U.S. Cl. 52-595 2 Claims

A sheet pile, preferably of two-inch thick lumber, made by gluing faces of the planks and clamping them in tight, unwarped face-to-face relation until the glue sets. The edges of the planks, at times uneven, are not glued to other plank edges; and the wide portions of the planks, even if previously warped, are forced by the clamping and gluing to remain in flatwise, strongly bonded arrangement. The invention also includes: ways of reinforcing the middle, tongue, and groove pile portions; means for interlocking piles together when they are in use; and a method of making the piles in a clamping fixture.

Keywords: Pile section connection; Pile, sheet; Pile, wood

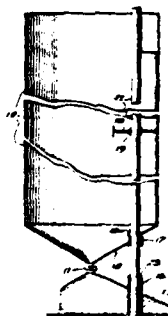
U.S. Cl. X.R. 52-233; 52-530; 61-58



3,553,969
SUBMERGED OIL STORAGE STRUCTURE
 Robert S. Chamberlin, Western Springs, William A.
 Davis, Glen Ellyn, and James E. Stevens, Palos Park,
 Ill., assignors to Chicago Bridge & Iron Company, Oak
 Brook, Ill., a corporation of Illinois
 Filed Dec. 23, 1968, Ser. No. 736,281
 Int. Cl. E02d 27/52
 U.S. Cl. 61-46 4 Claims

An offshore structure having an elongated shaft vertically positioned in a body of water and pivotally connected at its bottom end to a weight means on the floor of the body of water. The weight means can be a tank for storing oil.

Keywords: Offshore platform anchor; Offshore platform, floating; Offshore storage tank, submerged



3,553,970
INFLATABLE CLAMPING DEVICE
 George C. Wiswell, Jr., 1014 Pequot Road,
 Southport, Conn. 06490
 Filed Nov. 26, 1968, Ser. No. 779,184
 Int. Cl. E02d 5/60

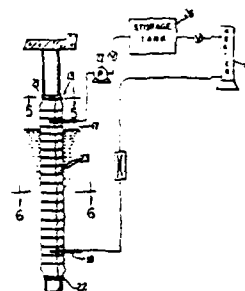
U.S. Cl. 61—54

8 Claims

An inflatable clamping device is provided for applying pressure to a coating on a submerged pile structure as the coating is being cured. The device is formed by attaching two sheets of flexible material together to form a fluid-tight chamber therebetween with the two sheets being wrapped around the coated material and a fluid under pressure introduced to the chamber between the sheets to apply a pressure against the coating. The inner sheet is formed of sufficient material so as to conform to the configuration of the pile, such as when the pile has an H-section.

Keywords: Coating; Corrosion prevention; Pile protection

U.S. Cl. X.R. 52-2; 128-402; 264-314



3,554,009
METHOD AND DEVICE FOR DETERMINING THE QUANTITY OF DREDGING SPOIL TO BE PAID
 Romke van der Veen, Jutphaas, Netherlands, assignor to N.V. Ingenieursbureau voor Systemen en Octrooien "Spanstaal," Rotterdam, Netherlands, a Dutch contracting company

Filed Apr. 21, 1969, Ser. No. 817,691
 Claims priority, application Netherlands, Apr. 24, 1968, 6805777

Int. Cl. G01n 15/06, 9/26

U.S. Cl. 73—61

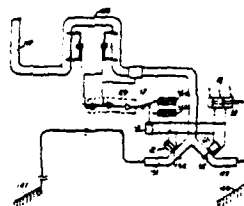
10 Claims

A method and apparatus are disclosed for measuring the quantity of dredging spoil. A flow of the spoil and water is guided vertically upwards along a first flow section and downwards along a second flow section. Pressure differentials between vertically spaced points on each flow section are obtained and added. The product of the pressure differential and flow velocity is integrated during the period in which the dredging spoil is being conveyed.

Keywords: Dredge-spoil measurement

U.S. Cl. X.R. 73-438

See: Re. 27,535



3,554,010
METHOD AND SUCTION DREDGING INSTALLATIONS FOR CONVEYING DREDGING SPOIL
 Romke van der Veen, Jutphaas, and Jan de Koning, Amsterdam, Netherlands, assignors to N.V. Ingenieursbureau voor Systemen en Octrooien "Spanstaal," Rotterdam, Netherlands, a Dutch company

Filed Apr. 21, 1969, Ser. No. 817,692
 Claims priority, application Netherlands, Apr. 24, 1968, 6805778

Int. Cl. G01n 15/06, 9/26

U.S. Cl. 73—61

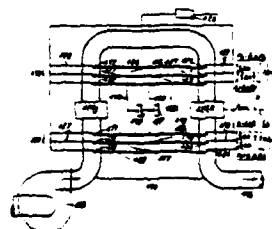
11 Claims

In a method and apparatus for measuring the quantity of a suspension of dredging spoil and water, means are provided to compensate for the presence of air in the suspension. The measure compensation is derived by taking pressure measurements of at least two flow sections in the system at which the prevailing pressures are different.

Keywords: Dredge-spoil measurement

U.S. Cl. X.R. 73-438

See: Re. 27,536



3,554,011
**METHOD AND DEVICE FOR DETERMINING THE
 CONVEY CONCENTRATION OF DREDGING
 SPOIL OF A SUSPENSION OF DREDGING SPOIL
 AND WATER**

Romke van der Veen, Jutphaas, Netherlands, assignor to
 N.V. Ingenieursbureau voor Systemen en Octroolen
 "Spanstaal," Rotterdam, Netherlands, a Dutch contract-
 ing company

Filed Apr. 21, 1969, Ser. No. 817,999

Claims priority, application Netherlands, Apr. 24, 1968,
 6805779

Int. Cl. G01n 15/06, 9/26

U.S. Cl. 73-41

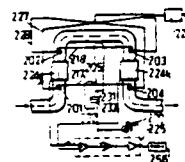
4 Claims

A system for measuring the concentration of a dredging
 spoil suspension wherein the suspension is caused to flow
 vertically upwards and vertically downwards in two pipe
 sections. Upper and lower conduits are coupled between
 corresponding upper and lower points on the two vertical
 pipe sections, and a pressure pickup is obtained between
 the midpoints of the upper and lower conduit.

Keywords: Dredge-spoil measurement

U.S. Cl. X.R. 73-438

See: Re. 27,526



3,554,290
**OIL POLLUTION CONTROL AND FIRE
 EXTINGUISHING APPARATUS AND METHOD**

Sam M. Verdin, 2600 Breton Drive, Marrero, La.

Filed Mar. 12, 1970, Ser. No. 18,846

Int. Cl. A62c 3/00

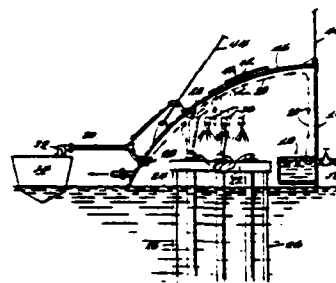
U.S. Cl. 169-2

4 Claims

A device for extinguishing gas and oil well fires, particu-
 larly multiple-well, offshore installations, and for preventing
 loss of oil to the surrounding area after fire extinction com-
 prises a hood adapted to be placed over the well site, the
 hood having a curved interior upper wall which deflects the
 gushing oil into a catch basin from which it can be pumped
 away.

Keywords: Pollutant burning; Pollutant
 collection; Pollutant, suction
 removal; Pollutant, surface
 barrier

U.S. Cl. X.R. 166-75



JANUARY 19, 1971

3,555,831

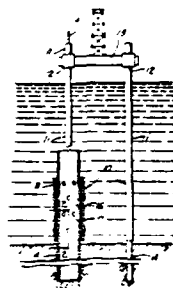
COMPOSITE FOUNDATION MEMBER AND METHOD

Ivo C. Pogonowski, Houston, Tex., assignor to Texaco Inc., New York, N.Y., a corporation of Delaware
Filed Sept. 16, 1968, Ser. No. 759,964
Int. Cl. E02b 17/00; E02d 21/00; B21d 39/04
U.S. Cl. 61—46.5 9 Claims

Keywords: Offshore construction; Pile, structure connection; Seabed foundation

U.S. Cl. X.R. 29-523; 61-53; 287-109

The invention relates to a foundation element or member of an offshore platform normally positioned in an anchoring medium to elevate the platform a predetermined distance above said medium. The foundation element comprises a first or outer casing disposed in a generally upright position and being operably or fixedly connected at the upper end to the platform. The opposed lower end of the foundation element comprises a pile or similar member adapted to be forcefully imbedded in the anchoring medium. The latter member is guidably positioned in the casing and is fastened to the casing at a peripheral interlocking joint to form the two concentric members into a unitary body.



3,555,832

FENDER

Jiro Narabu, Shibuya-ku, Tokyo, Japan, assignor to Seibu Gomu Kagaku Kabushiki Kaisha, Tokyo, Japan, a corporation of Japan
Filed Sept. 26, 1968, Ser. No. 762,820
Claims priority, application Japan, Apr. 10, 1968, 43/28,550
Int. Cl. E02b 3/20 5 Claims

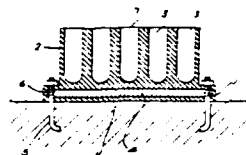
Keywords: Pier fender

U.S. Cl. X.R. 114-219

U.S. Cl. 61—48

5 Claims

The present invention relates to a fender constructed by boring a rubber plate having a base fixture with a large number of holes at appropriate intervals running in the direction from a contact surface of the plate to a fitting surface, said fender to be fitted to the wharf side or ship's side for the purpose of protecting the ship's hull.



3,556,035

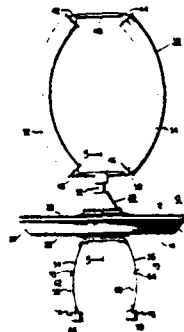
SAILING VESSEL

Ernest W. Schlieben, Morrisville, Pa., assignor to RCA Corporation, a corporation of Delaware
Filed Jan. 28, 1969, Ser. No. 794,589
Int. Cl. B63b 35/00, 1/26
U.S. Cl. 114—39 14 Claims

Keywords: Buoy, instrumented

U.S. Cl. X.R. 114-66.5

A sailing vessel is provided which includes an improved sail and an improved hydrofoil. The sail and the hydrofoil are each rigid and each has streamlined cross sections.



3,556,210
DEEP SEA WELL DRILLING STRUCTURE
 Vincent C. Johnson, 10377 Tennessee Ave., Los Angeles,
 Calif. 90064
 Filed May 8, 1969, Ser. No. 823,074
 Int. Cl. E21b 7/12, 33/035
 U.S. Cl. 166—5 8 Claims

An underwater well head encasement wherein a long tubular caisson rests on a base on the ocean floor and is provided with a housing at the top located 100 to 200 feet below the water surface. Hollow diagonal tubes brace the caisson in upright position. Drill guides extend from a chamber in the housing downwardly through the base to accommodate a number of well drilling operations. A closure for the casing is lifted off during the drilling and setting of casings. The closure is replaced after this and a diver can enter the chamber through a manhole and there work on the floor of the housing for installing and manipulating the well head equipment under conditions where the chamber may be either full of water or with the water evacuated.

Keywords: Offshore caisson; Offshore construction; Seabed oil, process structure

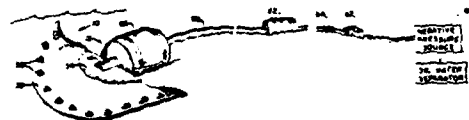
U.S. Cl. X.R. 61-46; 175-7



3,556,301
FLOATING FLEXIBLE SKIMMING DEVICES
 Millard F. Smith, Westport, Conn. ((P. O. Box 295, Saugatuck, Conn. 06882))
 Filed Oct. 20, 1969, Ser. No. 867,630
 Int. Cl. B01d 43/00
 U.S. Cl. 210—242 12 Claims

A skimming device for skimming oil and other waste materials from the surface of water is of lightweight nonrigid materials and comprises two parallel-spaced sheets with flexible edges. The device floats on the surface of water and flexibly conforms to waves and swells on the water surface. Skimming is performed by exposing a negative pressure intake portal to a shallow skimming zone directly beneath the surface. The narrow elongated intake portal is defined between a flexible floating underflow edge of one sheet and a second flexible overflow edge of a second sheet spaced beneath the first sheet.

Keywords: Pollutant, suction removal



JANUARY 26, 1971

3,557,559
WAVE-GENERATING APPARATUS
Douglas W. Barr, 5420 Irving Ave. S.,
Minneapolis, Minn. 55419
Filed May 12, 1969, Ser. No. 823,581
Int. Cl. E02b 3/00

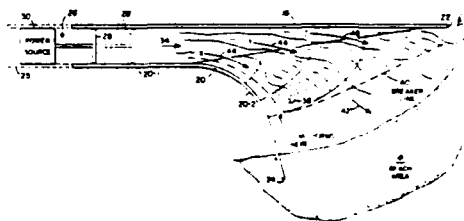
U.S. Cl. 61—1

9 Claims

Apparatus for generating waves in relatively small inland bodies of water, such as lakes, or large pools, for permitting surfing and the like, is described. The wave-generating apparatus includes means for defining the surfing area such as either one or a pair of vertical walls disposed in the water, with one of the walls or defining means being substantially straight and the second wall having a first portion arranged parallel to a portion of the first wall and a second portion arcuately diverging from said first wall in a manner to enhance the wave characteristics, and extending toward a beach area. The confined area is provided with a substantially flat or gradually inclining bottom or base, while the area defined adjacent the diverging walls is provided with an inclined bottom or base, so as to enhance the wave activity. A surge-generating device is located in the area where the first and second walls are parallel for imparting motion to the water therein, with breaking waves forming along the arcuate wall surface and propagating outwardly toward the first wall, while advancing along the inclined bottom and toward the batching area.

Keywords: Wave flume; Wave generator

U.S. Cl. X.R. 4-172.16



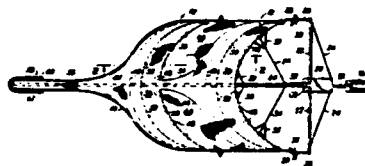
3,557,960
OIL SKIMMING APPARATUS
Hugh J. Fitzgerald, Austin, and Ernest H. Koepf, Dallas, Tex.,
assignors to Ocean Pollution Control, Inc., Dallas, Tex., a
corporation of Texas, by mesne assignments
Filed Dec. 16, 1969, Ser. No. 885,566
Int. Cl. E02b 15/04

U.S. Cl. 210—242

8 Claims

Apparatus for removing a film of oil from a large body of water comprising a pair of generally similar funnel assemblies, one positioned behind and in the wake of the other with a harness for towing the same along their common central axis, each funnel assembly having an impermeable cover with spaced floats to support its wide leading edge above the water to capture the oil with the rest of the cover being supported on the floating oil, depending skirts at the tapered trailing edges of the cover to funnel the oil inwardly toward its apex, an enclosing sack of reinforcing netting covering the top and bottom of the apparatus, a sump to receive the oil from the apex of the rearward assembly, and a pump to transfer the oil from the sump to a storage barge.

Keywords: Pollutant collection; Pollutant removal watercraft; Pollutant, suction removal; Pollutant, surface barrier



FEBRUARY 2, 1971

3,559,223
**LONG SPAR BUOY CONSTRUCTION AND
MOORING METHOD**

George S. Lockwood, Jr., and Robert K. Atwater, Los Angeles, Calif., assignors to Global Marine Inc., Los Angeles, Calif.

Continuation of application Ser. No. 548,566, May 9, 1966. This application July 30, 1969, Ser. No. 863,402
Int. Cl. B63b 21/26, 21/52

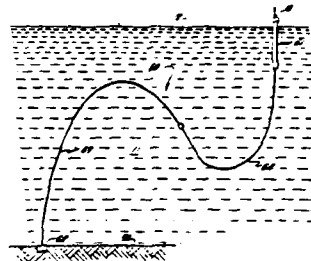
U.S. Cl. 9—8

5 Claims

A positively buoyant long spar buoy having a length of at least about 100 feet and a maximum body diameter of about 36 inches, the body being fabricated of lengths of pipe rigidly connected in end-to-end relation, the body including anti-flooding means adjacent each interpipe connection and being ballasted to float upright with a selected minor portion of its length out of water.

Keywords: Buoy, instrumented; Buoy mooring system

U.S. Cl. X.R. 114-206



3,559,407
ARTIFICIAL SEAWEED

Gerrit Schuur, Delft, Netherlands, assignor to Shell Oil Company, New York, N.Y., a corporation of Delaware

No Drawing. Filed Nov. 25, 1968, Ser. No. 778,757

Int. Cl. E02b 3/00

U.S. Cl. 61—3

3 Claims

An improved form of "artificial seaweed" for combating coastal erosion and the like comprises an anchored array of filamentary strands of foamed, stretched polyolefin, characterized by a internal plexiform structure surrounded by a substantially closed, thin skin, having a tensile strength of at least about 1 gram per denier and a final density below 500 g./l.

Keywords: Artificial seaweed; Seabed scour protection

No Figure

3,559,410
**SYSTEM FOR RELIEVING STRESS AT THE TOP
AND BOTTOM OF VERTICAL TUBULAR MEM-
BERS IN VERTICALLY MOORED PLATFORMS**

Kenneth A. Blenkarn and David A. Dixon, Tulsa, Okla., assignors to Pan American Petroleum Corporation, Tulsa, Okla., a corporation of Delaware

Filed July 30, 1968, Ser. No. 748,867

Int. Cl. B63b 35/44, 21/00

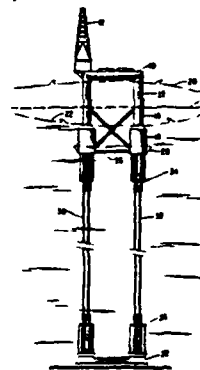
U.S. Cl. 61—46.5

12 Claims

Structure for relieving stresses at the top and bottom of elongated tubular members used to connect floating structure supported by a body of water to anchors on the floor thereof. Stop means surround each such connecting tubular member near each end thereof to limit the angular deflection of the tubular member at that point.

Keywords: Offshore platform anchor; Offshore platform, floating

U.S. Cl. X.R. 175-7



3,559,607
**MULTIPLE RETRIEVAL SYSTEM FOR OBJECTS IN
 SUBMARINE ENVIRONMENT**
 Aleksander B. Macander, Jersey City, N.J., and Clarence K.
 Chatten, Jackson Heights, N.J., assignors to The United
 States of America as represented by the Secretary of the
 Navy

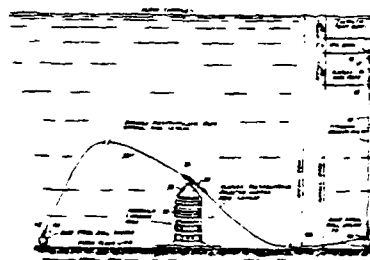
Filed Jan. 28, 1969, Ser. No. 794,508
 Int. Cl. B63c 7/02

U.S. Cl. 114—51

6 Claims

A multiple retrieval system for objects placed on the sea floor for extended periods of time comprising holding means and three retrieval means. The first retrieval means is a vertical line system, the line being fabricated of titanium monofilament fastened to a cast-steel ball anchor at the lower end and a syntactic-foam globular buoy at the upper end which is some 50 feet below the ocean surface. The second retrieval system comprises a 5200-foot length (approximately) of polypropylene-jacketed, aluflex line extending from said cast-steel ball anchor to a frame for holding the submerged object. The third retrieval system comprises a 5,000-foot length (approximately) of polypropylene, self-buoyant rope extending from the frame to another cast-steel ball anchor.

Keywords: Instrument retrieval



3,559,762
SAFETY LADDER FOR WATER USE
 Kenneth L. Thompson, Huntington Beach, Canada, assignor
 to Ye Dock Master, Inc., a corporation of California
 Filed Sept. 26, 1969, Ser. No. 861,328
 Int. Cl. E06c 1/39

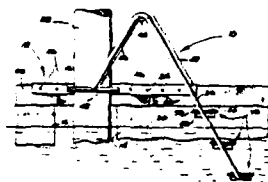
U.S. Cl. 182—93

10 Claims

A safety ladder for use in water in combination with a pile extending above the surface of the water and a floating structure. The floating structure includes means for encircling the pile to be thereby limited in lateral movement. At least one of the side rails is secured to the floating structure and at least one of the side rails is secured to the pile encircling means.

Keywords: Pier, floating; Small-craft pier

U.S. Cl. X.R. 182-106; 182-115; 182-129



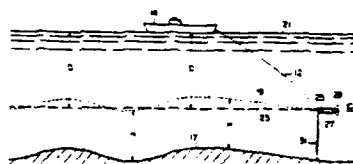
3,560,912
CONTROL SYSTEM FOR A TOWED VEHICLE
 Paul G. Spink, Severna Park, and James T. Malone, Ar-
 nold, Md., assignors to Westinghouse Electric Corpora-
 tion, Pittsburgh, Pa., a corporation of Pennsylvania
 Filed Feb. 3, 1969, Ser. No. 795,913
 Int. Cl. B63b 21/00; B64d 3/00; G01s 9/68
 U.S. Cl. 340—3

6 Claims

A towed underwater vehicle having rotatable wing and tail surfaces is maintained in a predetermined orientation at a constant height above the ocean bottom, or at a constant depth below the surface, by commanding a rate of rotation of the wing or tail surfaces when a deviation from the desired attitude occurs.

Keywords: Towed body depth control;
 Towed vehicle

U.S. Cl. X.R. 114-235; 244-3



3,561,219
**TEXTILE MAT FOR INDUSTRIAL USE IN THE
 FIELD OF CIVIL ENGINEERING**
 Masazumi Nishizawa and Kaizo Kotera, Otsu-shi, and
 Michitsura Ohta, Takatsuki-shi, Japan, assignors to
 Toray Industries, Inc., Tokyo, Japan, a company of
 Japan

Filed Apr. 10, 1968, Ser. No. 720,234
 Claims priority, application Japan, Oct. 13, 1967,
 42/86,482; Dec. 19, 1967, 42/105,514
 Int. Cl. E02b 3/12

U.S. Cl. 61—38

9 Claims

A fabric mat for soil stabilization has continuous bands of single ply fabric alternating with intervening continuous bands of two-ply fabric forming between the two plies continuous hollow tubelike containers which are filled with sand, gravel or the like. One end of the tubelike containers is closed before filling and the other after filling. The mats may have selvages along opposite side edges which are secured to selvages of like mats to connect a plurality of mats together.

Keywords: Fabric mat; Seabed scour protection; Slope protection



3,561,220
**METHOD AND APPARATUS FOR CONTAINING
 WELL POLLUTANTS**

Chester George Riester, 10397 South Lake Blvd.,
 Parma, Ohio 44130

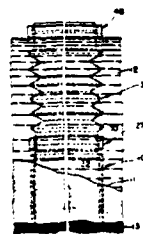
Filed Mar. 26, 1969, Ser. No. 810,733
 Int. Cl. E02b 1/00

U.S. Cl. 61—34

11 Claims

A well installation apparatus and method, particularly for offshore wells, utilizing a large coffer or caisson surrounding the well point, such coffer or caisson including a submerged caisson having secured to the top thereof an annular axially expandable substantially water impermeable extension secured at its lower end to the top of the submerged caisson and at its top to a floating ring.

Keywords: Offshore caisson; Pollutant, submerged barrier



3,561,267
BATHYTHERMOMETER
 Robert B. Costello, Santa Barbara, Calif., assignor to
 General Motors Corporation, Detroit, Mich., a corporation of Delaware

Filed Apr. 10, 1964, Ser. No. 358,746
 Int. Cl. G01k 13/00

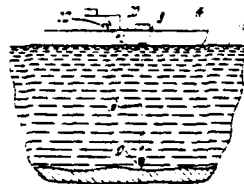
U.S. Cl. 73—344

6 Claims

An aquatic probe to measure the temperature of a body of water is arranged to travel through the water from a moving ship in a free-fall descent. A coiled electrical conductor, connecting the probe to a recording station on the ship, is payed out from both the probe and the ship in such a manner so that the conductor will have practically no effect upon the descent characteristics of the probe.

Keywords: Bathythermograph; Instrument deployment

U.S. Cl. X.R. 43-4; 73-170

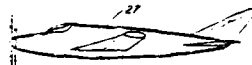


3,561,268
EXPENDABLE BATHYTHERMOGRAPH
 Frank Massa, Cohasset, Mass., assignor to Massa Division,
 Dynamics Corporation of America, Hingham, Mass.
 Filed Jan. 14, 1969, Ser. No. 790,965
 Int. Cl. G01k 1/02; G01i 19/08
 U.S. Cl. 73-345 14 Claims

Free-falling underwater body which has a streamlined hull characteristic that causes a stable rate of fall through water. The body contains an oscillator connected to a piezoelectric transmitting transducer for radiating sound waves through the water at the oscillator output frequency. Two sensors alter the oscillator output frequency as a function of depth and temperature. A receiver on the surface of the water receives the radiated sound waves and prints out the temperature and depth of the water through which the falling body is then passing.

Keywords: Bathythermograph; Instrument deployment

U.S. Cl. X.R. 73-170; 340-5

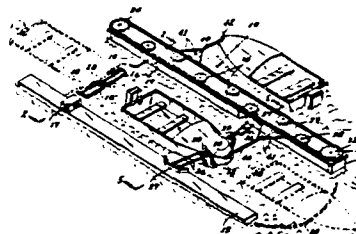


3,561,391
BOAT WASHING APPARATUS AND METHOD
 Norman C. Locati, 1714 Meadow Drive, Lake Oswego, Oreg.
 97034
 Filed Mar. 3, 1969, Ser. No. 803,654
 Int. Cl. B63b 59/00
 U.S. Cl. 114-222 7 Claims

Two parallel elongated floating support means define a pathway for a boat. Powered brushing members are carried by double jointed arms that are anchored to the floating support means. Said powered brushing members are spring biased to conform to the various shapes of boats that are passed through the pathway and clean algae, barnacle spores and the like from the submerged portion of the boats.

Keywords: Small-craft service structure

U.S. Cl. X.R. 15-1.7

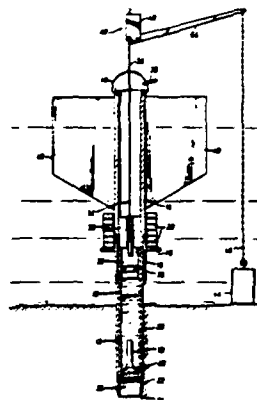


3,561,546
METHOD OF AND APPARATUS FOR UNDERWATER GEOCHEMICAL EXPLORATION
 Calvin B. Craig, Dayton, Tex., assignor to Leo Horvitz, Houston, Tex.
 Filed Nov. 12, 1968, Ser. No. 774,901
 Int. Cl. E21b 9/20, 25/00; G01n 23/04
 U.S. Cl. 175-5 2 Claims

A method of and apparatus for underwater geochemical prospecting by taking samples of the bottom formation and water at or immediately above the bottom. The method comprises taking samples simultaneously of the water at the bottom and of the earth formation immediately below at spaced apart locations for analysis to determine the concentration of significant hydrocarbon leakage products from subterranean petroleum deposits to be used in exploring for such deposits. The sample taking apparatus comprises a tubular body whose lower end is open and provided with means for penetrating the bottom formation and retaining a sample of the same in the body. The sample taker includes a piston movable upwardly from a lower position closing the lower end portion of the body to an upper position above when the body reaches a predetermined position at or close to the bottom during its downward travel to draw in a sample of water at or immediately above the bottom. The apparatus is adapted to be suspended by an operating cable and means is provided for adjusting the piston actuating means to allow predetermined setting of the apparatus to allow free fall of the body from a desired point of its downward travel before the body penetrates the bottom formation.

Keywords: Sampler, seabed-driven core; Sampler, water

U.S. Cl. X.R. 23-230; 23-253; 175-245



3,561,547

BOTTOM SAMPLER

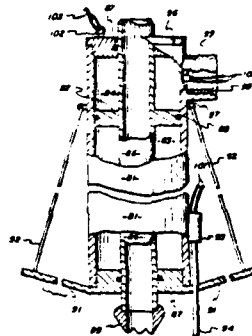
Vlash A. Pullos, Garden Grove, Calif., assignor to North American Rockwell Corporation
Original application Nov. 15, 1965, Ser. No. 507,904, now Patent No. 3,439,537. Divided and this application Sept. 18, 1968, Ser. No. 795,748
Int. Cl. E21b 7/12, 25/00

U.S. Cl. 175-6

3 Claims

This invention relates to apparatus for obtaining forceful motion and more particularly relates to apparatus for obtaining forceful motion underneath a body of water. In particular, a bottom sampler has a piston actuated by hydrostatic pressure, which upon contact of the sampler with the sea floor, drives a hollow tube into the sea floor for collecting a sample. An explosive detonator triggered by contact with the sea floor adds to hydrostatic pressure to rupture a diaphragm and actuate the piston.

Keywords: Sampler, power supply; Sampler, seabed-driven core



3,561,601

OIL SLICK DISPERSION APPARATUS

William H. McNeely, San Diego, Calif. (c/o Ara-Chem. Inc., 808 Gable Way El Cajon, Calif. 92020)
Filed Oct. 24, 1969, Ser. No. 869,015
Int. Cl. C02b 9/02; E02b 15/04

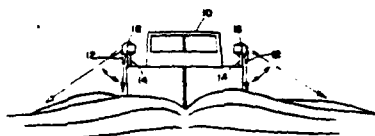
U.S. Cl. 210-242

3 Claims

An oil slick on a body of water is dispersed by a specially equipped boat which is driven through the slick to separate and concentrate the oil on the boat's bow wave. From nozzles on opposite sides of the boat near the bow, a mixture of water and a chemical dispersant is directed against the oil as a high pressure jet in a cyclically oscillating path sweeping across the bow wave generally perpendicular to the direction of travel. The rate of oscillation is sufficiently fast to apply the dispersant over all of the oil in the vicinity of the boat and due to the particular oscillating action, a concentration of dispersant is applied close to the boat where the oil is heaviest on the bow wave.

Keywords: Pollutant dispersion; Pollutant removal watercraft

U.S. Cl. X.R. 114-.5



FEBRUARY 16, 1971

3,562,917

APPARATUS FOR MEASURING IRREGULAR SURFACES OF DEPOSITS OF CONCRETE BLOCKS OR RUBBLE MOUNDS

Ken Matsui, Nagoya-shi, Japan, assignor to Nippon Tetrapod Co., Ltd., Tokyo, Japan, a corporation of Japan
Filed June 5, 1968, Ser. No. 734,600
Int. Cl. G01b 3/00, 5/20; G01c 7/00

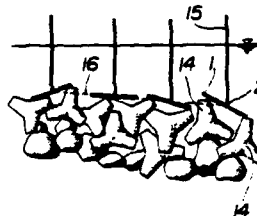
U.S. Cl. 33-126.5

4 Claims

Apparatus for measuring an irregular surface of a deposit is comprised by a perforated or grid shaped circular or polygonal flat plate or frame structure with a measuring point at the center thereof and a layer of tetrapods deposited on the irregular surface, all of one size which is such that the frame member will cover at least two of them, to obtain by sounding the layer with the frame, a reliable measurement of the general configuration or envelope of extremely irregular surfaces. The tetrapods may be incorporated in a structure which is built up on the irregular surface, as in repairing a breakwater.

Keywords: Breakwater, rubble; Concrete armor unit; Seabed site survey; Structure inspection

U.S. Cl. X.R. 33-1; 73-432; 114-206



3,563,036

INFLATABLE FLOATING BOOMS

Millard F. Smith, Westport, Conn. (P.O. Box 295, Saugatuck, Conn. 06882) and Russell M. Blair, Westport, Conn.; said Blair assignor to said Smith
 Filed Sept. 2, 1969, Ser. No. 854,626
 Int. Cl. E02b 3/04, 15/04

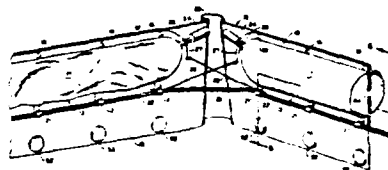
U.S. Cl. 61—1

9 Claims

Accordion-folding floating booms for confining spilled oil or other floating material incorporating a thin continuous flexible fin positioned vertically and provided with numerous, short, inflatable balloon-like float pockets mounted along its upper edge. The float pockets are all deflatable and collapsible for compact accordion-folded stowage of the boom in limited volumes of space for storage, shipment and delivery to the site by water transport or by airdrop. Automatic inflation of successive inflatable float pockets upon unfolding deployment of the booms is achieved by individual pressure sources actuated by the deployment process, providing inflation pressure to produce fully inflated expansion of the float pockets for buoyant floatation of the boom structure. Compressed gas charge cylinders triggered by unfolding of the boom supply the desired inflation pressure. Alternatively, chemical reactants enclosed in adjacent enclosures are mixed together upon unfolding deployment of the boom to produce sufficient amounts of gaseous reaction product to provide inflation pressures required for each buoyant balloon-like float pocket.

Keywords: Pollutant, surface barrier

U.S. Cl. X.R. 9-319



3,563,037

MINIMIZING SCOURING ACTION IN WATER FLOW CHANNELS

Albert James Stammers, 23 Shottfield Ave., East Sheen, London, SW. 14, England
 Filed Dec. 17, 1968, Ser. No. 784,314
 Claims priority, application Great Britain, July 18, 1968, 34,252/68
 Int. Cl. E02b 3/04, 3/12

U.S. Cl. 61—3

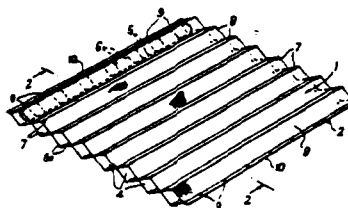
9 Claims

A means for minimising the scouring effect of water flow on the beds of rivers, estuaries and the sea bed comprising a tubular element composed of a meshed upper panel through which ballast material can pass to the interior of the element. If desired, the element may have a meshed lower panel through which sand or other bed material may pass but through which the ballast is unable to escape and a plurality of elements may be joined together in parallel relationship to form a unit.

The or each tubular element may be provided internally with a plurality of spaced apart distending members.

Keywords: Fabric mat; Seabed scour protection; Slope protection

U.S. Cl. X.R. 61-37; 139-384; 139-387



3,563,041
OFF-SHORE SHIP MOORING INSTALLATION

Bernard Michel, 739 Rue des Vignes,
Ste.-Foy, Quebec 10, Canada
Filed Mar. 14, 1969, Ser. No. 807,236
Int. Cl. E02b 3/22; E02d 27/36

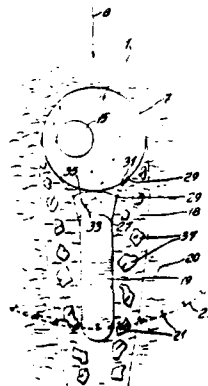
U.S. Cl. 61—46

5 Claims

An off-shore ship mooring installation made up of a wharf in the form of a columnar body built on the bottom of the sea and having a circular mooring head that projects above the sea in combination with a string of dolphins distributed on a circle circumscribing the mooring head and located away from the said head a distance such as to allow mooring of the stern of one or more ships when the ships are moored to the head by the bow thereof.

Keywords: Ice protection; Offshore mooring structure

U.S. Cl. X.R. 61-48; 114-230



3,563,334
SEISMIC SOURCE FOR USE WHILE SUBMERGED IN A LIQUID MEDIUM

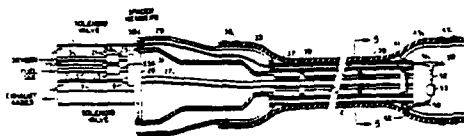
Ed R. McCarter, Houston, Tex., assignor to Esso Production Research Company, a corporation of Delaware
Filed July 3, 1968, Ser. No. 742,387
Int. Cl. G01v 1/04

U.S. Cl. 181—0.5

9 Claims

Seismic source for use in an aqueous medium utilizes an elastomer member supported by and disposed on at least a portion of a supporting structure. The supporting structure preferably includes a number of tubular members connected at the trailing end to a bell-shaped member and at a towing end to a pair of bell-shaped members positioned to discharge liquid from the medium into the tubular members. An explosively combustible fluid is introduced into the chamber formed by the elastomer member and the support structure through a mixing chamber and an elongated pipe that extends into the chamber. The explosive fluid is ignited in the mixing chamber. Pump means is provided for removing liquid from the interior of the chamber.

Keywords: Seismic explosive acoustic transmitter



3,563,607
SUBAQUEOUS MINING
Bede A. Boyle, Newcastle, New South Wales, Australia, assignor to Laurice Winifred Boyle, Newcastle, New South Wales, Australia, a fractional part interest to each part interest

Filed Apr. 15, 1969, Ser. No. 816,200
Claims priority, application Australia, May 2, 1968, 37225/68

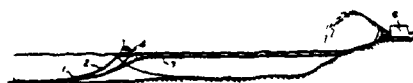
Int. Cl. E21c 45/00; E02f 3/88
U.S. Cl. 299—9

7 Claims

A subaqueous mining machine having an underwater suction head which has a suction pump mounted on it. The pump is driven by a high pressure air hose and a semibuoyant discharge hose is used to conduct the pumped slurry to a shore-based treatment means. The underwater head can be steerable by means of jet control pumps which are part of it.

Keywords: Dredge, suction; Dredge intake; Pump

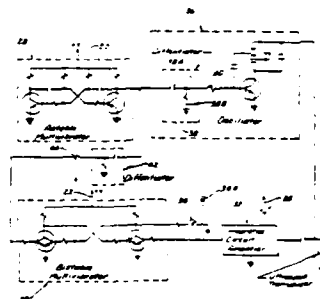
U.S. Cl. X.R. 37-59



3,564,490
**METHOD AND MEANS FOR MEASURING
 DEPTH OF WATER OR THE LIKE**
 Roger C. Camp, Ames, Iowa, assignor to Iowa State
 University Research Foundation, Ames, Iowa, a corpo-
 ration of Iowa
 Continuation of application Ser. No. 700,511, Jan. 25,
 1968. This application Aug. 19, 1969, Ser. No. 854,020
 Int. Cl. G01s 9/68
 U.S. Cl. 340—3 4 Claims

An electronic depth gauge wherein a low frequency pulse generator is connected to an ultrasonic transducer through an oscillator to emit a signal downward through a body of water or the like, with the reflected signal being received by the transducer and converted to a reflected voltage input. An amplifier is connected to the transducer to amplify the reflected voltage, which in turn is connected to a switching mechanism. The switching mechanism is connected to the low frequency pulse generator and a meter of the D'Arsonval type, which is graduated in feet and which measures average current values proportional to the time that the unit measures maximum depth with respect to the time that the switching mechanism is interrupted by the amplified voltage of the signal reflected from the bottom of the body of water.

Keywords: Sonar, depth sounder

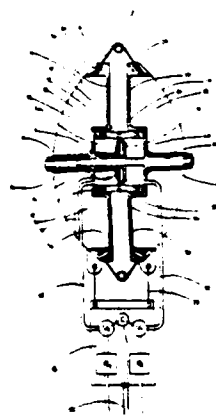


3,564,492
**DEVICES FOR EMITTING ACOUSTIC WAVES IN
 A LIQUID MEDIUM**
 Pierre Magneville, Vernouillet, and Claude Duconge, Le
 Vesinet, France, assignors to Institut Francais du
 Pétrole, des Carburants et Lubrifiants, Malmaison,
 Hauts-de-Seine, France
 Filed Nov. 21, 1968, Ser. No. 777,838
 Claims priority, application France, Nov. 21, 1967,
 129,124
 Int. Cl. H04r 23/02

U.S. Cl. 340—12 16 Claims
 This device comprises at least two movable elements made of a rigid material and interconnected by a tightening membrane made of a deformable material which constitutes a tight enclosure with the movable elements. These elements have contact areas adapted to be applied intermittently against each other. Releasable means are provided for moving these elements away from each other and for locking them in spaced relationship to each other, as well as means for limiting the deformation of the membrane toward the interior of the enclosure and means for creating in this enclosure a pressure much lower than the pressure prevailing outside the enclosure.

Keywords: Seismic implosive acoustic transmitter

U.S. Cl. X.R. 181-.5



FEBRUARY 23, 1971

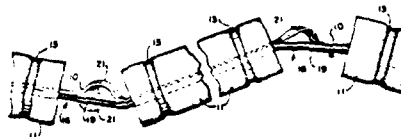
3,564,852
FLEXIBLE FLOATING BOOMS
Millard F. Smith, Westport, Conn.
(P.O. Box 295, Saugatuck, Conn. 06882)
Filed Aug. 25, 1969, Ser. No. 852,776
Int. Cl. E02b 3/04, 15/04

U.S. Cl. 61—1

6 Claims

Keywords: Pollutant, surface barrier

A supple, flexible, floating oil boom, self-reinforced by a taut, integral, high-tensile-strength, multiple-strand stainless steel cable anchored centrally at longitudinally spaced points to a thin, flat, flexible polymer fin. The fin is arrayed "standing on edge" in a generally vertical position, and the cable is anchored to the fin at a level adjacent to the undersides of longitudinally spaced-apart buoyant floats likewise anchored to the flat continuous fin along its upper edge. The cable is held just beneath the water surface when the boom is afloat, with ballast weights anchored along its lower edge holding the boom upright. In the regions between the buoyant floats, the fin is provided with excess slack length forming loosely curved bights of extra fin material, having a greater length than the corresponding segment of taut reinforcing cable, and providing extreme flexing capability in all directions. The excess slack fin bight between floats permits sharply bent flexing of the boom to conform closely to the crest or trough of a steep wave while maintaining full tension on the taut reinforcing cable. The boom is likewise capable of sharply-bent, sidewise lateral flexing in response to waves, turbulence, impacts or manual accordion-folding operations.



3,564,853
**METHOD OF CONTROLLING EROSION
ON SEASHORES**
Zoltan Csizsar, 96 Walpole St., Merrylands,
New South Wales 2160, Australia
Filed Mar. 24, 1969, Ser. No. 809,839
Int. Cl. E02b 3/04

U.S. Cl. 61—5

10 Claims

Keywords: Bar protection; Fabric mat; Groin,
Low-cost shore protection

The invention relates to methods of and appliances for preventing the erosion by wave action of foreshores of large expanses of water. The appliances comprise flexible curtains of fine mesh placed below the water level in the path of incoming waves in the large expanses of water. Sand or sediment is allowed to build up on one side or the other of the flexible screens.



3,564,856

PROCESS AND APPARATUS FOR CEMENTING OFFSHORE SUPPORT MEMBERS

Elmo M. Blount, Irving, and Joseph U. Messenger, Dallas, Tex., assignors to Mobil Oil Corporation, a corporation of New York

Filed Apr. 11, 1969, Ser. No. 815,476

Int. Cl. E02d 5/34

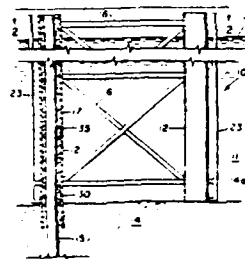
U.S. Cl. 61—46

10 Claims

The specification discloses a process and apparatus for cementing in two stages an annulus formed between an offshore support member and a pile driven therethrough. The support member is provided with a first port which normally lies adjacent the mudline when the support member is in position and a second port vertically spaced upward from the first port. A batch of quick-setting cement material, e.g., gypsum cement mixtures, is pumped through the first port to fill the annulus to a level approximately adjacent the second port. This material is allowed to set to form a seal at the lower end of the annulus and then additional cement material is pumped through the second port to finish filling the annulus.

Keywords: Grouting; Offshore construction; Offshore platform, leg; Pile, structure connection; Seabed foundation

U.S. Cl. X.R. 61-53.5; 61-56



3,564,858

BOAT LANDING FOR OFFSHORE STRUCTURE

Ivo C. Pogonowski, Houston, Tex., assignor to Texaco Inc., New York, N.Y., a corporation of Delaware

Filed Apr. 1, 1969, Ser. No. 812,123

Int. Cl. E02b 3/22

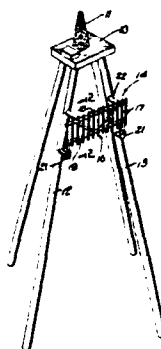
U.S. Cl. 61—48

5 Claims

The invention relates to a landing platform for a pier or offshore structure which is ordinarily subject to high waves, turbulent water and/or a generally corrosive atmosphere. The replaceable landing platform is operably carried on the offshore structure and so mounted to absorb the shock of a floating vessel when the latter comes in severe contact with the platform during a docking, loading or unloading operation. The platform includes a resilient, pivotal connection as well as one or more shock-absorbing elements which permit restrained horizontal movement when the platform is subjected to a displacing force.

Keywords: Offshore mooring structure; Offshore structure fender

U.S. Cl. X.R. 114-219

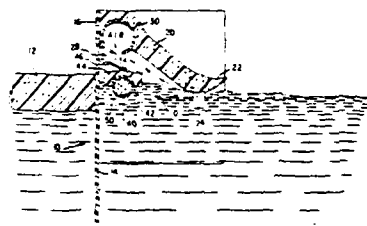


3,565,254
**APPARATUS FOR CONFINING A SLICK AND
 COLLECTING OIL THEREFROM**
 John P. Latimer, Newport News, Va., assignor to Deepsea
 Ventures, Inc., Newport News, Va.
 Filed Sept. 11, 1969, Ser. No. 856,945
 Int. Cl. E02b 15/04
 U.S. Cl. 210-170 19 Claims

Buoyancy means is connected with a body means for retaining the body means in operative position in a body of water. A foot portion extends from the upper part of the body means and extends at an angle downwardly therefrom to define a space between the body means, the foot portion and the surface of the body of water. An air suction means is provided for reducing the pressure in said space and extends lengthwise of the boom. Means for collecting oil is also supported in said space and extends lengthwise of the boom for collecting oil within the space.

Keywords: Pollutant collection; Pollutant, suction removal; Pollutant, surface barrier

U.S. Cl. X.R. 210-242

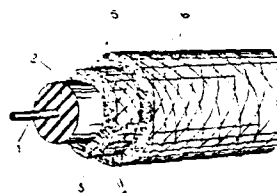


3,565,257
FLOATING BARRIER FOR WATER POLLUTANTS
 Cesare Cavallieri, p. le Comune, Sulzano, Brescia, Italy
 Filed Dec. 5, 1969, Ser. No. 870,409
 Int. Cl. E02b 15/04
 U.S. Cl. 210-242 3 Claims

The barrier for arresting, confining and absorbing water pollutants in suspension therein, such as tankers, discharged fluids, consists of a preferably cylindrical body containing a central propylene fiber rope surrounded in succession by a layer of polystyrene (blocks or granules), a layer of a mixture of propylene staples or waste and polystyrene granules, contained in a netting of propylene fiber, and a final layer of propylene staples or waste also contained in a netting. The barrier is floating so as to keep about one-half of its volume above the surface of the water.

Keywords: Pollutant absorption; Pollutant, surface barrier

U.S. Cl. X.R. 61-1; 161-175

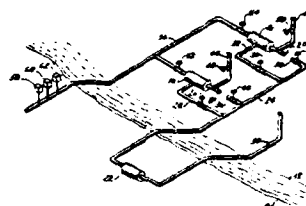


3,565,491
JET PUMP METHOD AND SYSTEM
 David M. Frazier, 208 Shorecrest, Tampa, Fla. 33609
 Filed Aug. 20, 1968, Ser. No. 754,005
 Int. Cl. B65g 33/30
 U.S. Cl. 302-14 19 Claims

A method and system for pumping particulate solids in such application as removing submerged beach sand, and unloading dry solids from a storage container. A jet pump is submerged in the solids and upon application of high pressure primary liquid to the pump, the solids are discharged. To provide an optimum mixture of solids and liquid, a diluting liquid agitates the solids in the vicinity of the pump's intake and an additional diluting liquid is directed to the intake of the pump itself. The velocity, density and/or pressure of the pump's discharge is measured and the diluting liquid is accordingly regulated to provide a proper solid/liquid ratio at a desired discharge velocity.

Keywords: Channel protection; Dredge-spoil measurement; Dredge-spoil transport; Dredge, suction; Pump; Tidal inlet

U.S. Cl. X.R. 302-15



3,565,672

METHOD OF IMPROVING RESISTANCE TO CORROSION OF METAL SURFACE AND RESULTANT ARTICLE

Ben E. Adams, Carlsbad, N. Mex., assignor to Continental Oil Company, Ponca City, Okla., a corporation of Delaware

No Drawing. Filed May 8, 1968, Ser. No. 729,875

Int. Cl. B32b 15/04; B44d 1/14

U.S. Cl. 117-75

25 Claims

Keywords: Coating; Corrosion prevention

U.S. Cl. X.R. 117-72; 117-92; 117-132;
252-33; 252-389

This disclosure relates to a method of improving resistance to corrosion of metal surfaces, wherein the method comprises:

- (a) applying to the metal surface a grease-like composition consisting essentially of a nonvolatile diluent, an oil-soluble dispersing agent, and a basic alkaline earth metal compound, and
- (b) applying to the coated metal surface a conventional paint.

An important feature is the use of the particular grease-like composition as a primer coating.

No Figure

MARCH 2, 1971

3,566,476

FLOTATION SYSTEM

William M. Davidson and Howard W. Cole, Jr., Mountain Lakes, N.J., assignors to Proteus, Inc., Mountain Lakes, N.J.

Filed Apr. 30, 1968, Ser. No. 725,398

Int. Cl. B63b 21/52

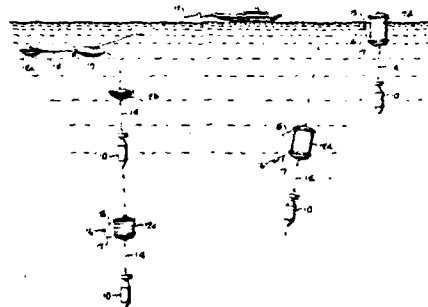
U.S. Cl. 9-9

10 Claims

Keywords: Instrument retrieval

U.S. Cl. X.R. 114-235

A flotation device useful for lifting a submerged load to the surface comprises a clam-shaped container made up of a top cover and a bottom cover and an inflatable bag therein. The open end of the inflatable bag is fixed to the inside of the bottom cover and the closed upper end of the inflatable bag is fixed to the inside of the upper cover, said top and bottom covers being releasably gripped together. Gas generating means preferably made up of a solid chemical compound reactive upon contact with water to generate a gas, such as hydrogen gas, is provided within the container. The container is free flooding and when the gas generating means is activated to expose said chemical compound, such as a hydride, oxide or peroxide of a metal selected from the group consisting of lithium, sodium, calcium, potassium and aluminum and mixtures thereof, to contact with water, the resulting generated gas releases the top cover from the bottom cover and is confined within and inflates the inflatable bag so as to lift the submerged object to which the device is attached.



3,567,019

OIL LEAKAGE BARRIER

Edward E. Headrick, 4900 Crown Ave., La Canada, Calif.

Filed Mar. 18, 1969, Ser. No. 808,287

Int. Cl. E02b 15/04, C02c 01/38

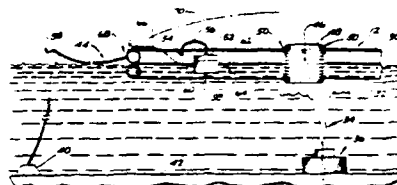
U.S. Cl. 210-87

4 Claims

A light weight, elongated, flexible, tubular structure is provided for use in confining leaking oil and other lighter-than-water substances to a predetermined area. At an offshore location the ends of the structure are drawn together to create a closed figure surrounding the point where oil is surfacing. The structure is divided into two chambers, one of which is filled with a liquid having at least the specific gravity of the liquid in which the structure floats. The second chamber of the structure is adapted to be distended such that a barrier is created extending above and below the surface producing a surface interlock with the liquid below the floating substance to prevent the substance from slipping beneath the barrier.

Keywords: Pollutant, suction removal;
Pollutant, surface barrier

U.S. Cl. X.R. 61-1; 210-242



3,567,953

TIDE-OPERATED POWER PLANT

Bruno Lord, Lac Beillemare, St. Mathieu, Province of Quebec, Canada

Filed Mar. 10, 1969, Ser. No. 805,681

Int. Cl. F03b 13/12

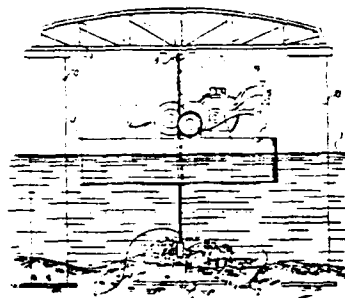
U.S. Cl. 290-42

2 Claims

A tide-operated power plant consisting of an electric generator mounted on a float, a driving train for said generator, including a reverse and operated by a member stationary with respect to the water bottom, whereby up-and-down movement of the float will drive the generator.

Keywords: Electrical generator; Power, tide

U.S. Cl. X.R. 290-53



MARCH 9, 1971

3,568,449

**CONSTRUCTION OF LAND MASSES
BOUNDED BY WATER**

Mitchell A. Lekas, Concord, Calif., assignor to the United States of America as represented by the United States Atomic Energy Commission

Filed Oct. 2, 1969, Ser. No. 863,167

Int. Cl. E02d 17/16; F42d 3/04

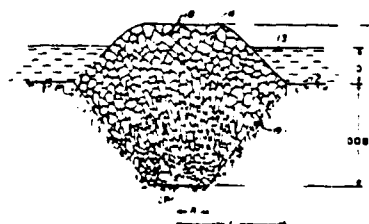
U.S. Cl. 61-35

2 Claims

A land mass, such as an island, jetty, or the like is constructed in a body of water by explosively mounding the water body floor to form a mass of broken rock, or so-called retard (invert crater) rising above the water surface.

Keywords: Breakwater, rubble; Offshore construction; Offshore island

U.S. Cl. X.R. 102-23



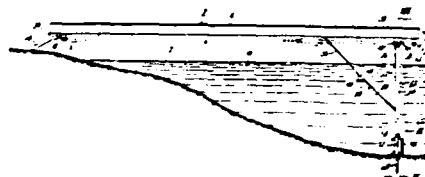
3,568,451
PORTABLE DOCK
 Victor H. Gustin, Kansas City, Mo.
 (204 Queens Lane, Blue Spring, Mo. 64015)
 Filed Dec. 17, 1968, Ser. No. 784,450
 Int. Cl. E02b 3/20

U.S. Cl. 61—48 3 Claims

A portable dock consisting of a gangplank adapted to be carried by a small boat and to be extended between said boat and the shore, said gangplank having legs at both the shore end and boat end thereof, all of said legs being foldable against the gangplank for convenience of storage, and the legs at the boat end being adjustable extensible to engage the bottom to compensate for variable water depths, and for irregular contour of the bottom.

Keywords: Pier, fixed; Pier, mobile;
 Small-craft pier

U.S. Cl. X.R. 248-157; 248-188.6

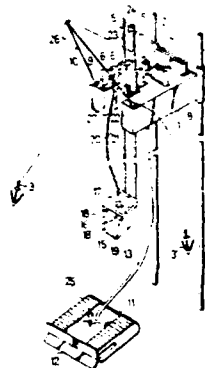


3,568,454
APPARATUS FOR WORKING UNDER WATER
 Yasuo Itami, Tokyo, Japan, assignor to Japan Development and Construction Co., Ltd., Tokyo, Japan
 Filed Mar. 13, 1969, Ser. No. 806,902
 Claims priority, application Japan, Oct. 18, 1968, 43/91,343
 Int. Cl. B63c 11/40, 11/42
 U.S. Cl. 61—69 6 Claims

Apparatus for working under water comprising a combination of a submergible working machine such as a bulldozer and a floating body equipped with various devices necessary for operating the working machine. A submergible control chamber accommodating an operator is suspended into water from the floating body to enable the operator to control the operation of the working machine.

Keywords: Offshore platform, floating;
 Seabed grader

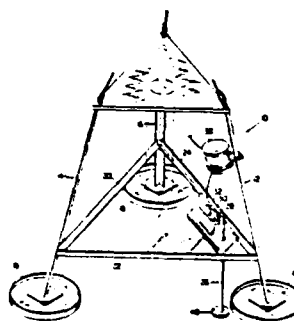
U.S. Cl. X.R. 37-56; 61-46.5; 114-16



3,568,622
EXPLOSIVE ANCHOR FIRING DEVICE
 John R. Thompson, Camarillo, Calif., assignor to the United States of America as represented by the Secretary of the Navy
 Filed May 14, 1969, Ser. No. 824,532
 Int. Cl. B63b 2/128
 U.S. Cl. 114—206 5 Claims

An anchor construction wherein an explosive charge propels anchor members into the ocean floor. It includes means for firing the charges a predetermined period of time after the device has reached the ocean floor, such means operating without the use of any command link between the anchor and the surface and being capable of postponement if the anchor construction is lifted from the floor before the charge is ignited.

Keywords: Embedment anchor



3,569,725

WAVE-ACTUATED POWER GENERATOR-BUOY

Edgar N. Rosenberg, San Diego, Calif., assignor to the United States of America as represented by the Secretary of the Navy

Filed Feb. 9, 1970, Ser. No. 9,709

Int. Cl. F03b 13/12

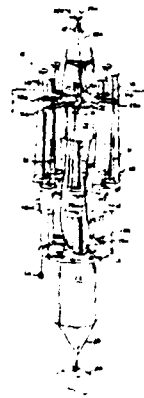
U.S. Cl. 290-53

7 Claims

Keywords: Buoy, instrumented; Electrical generator; Instrument power supply; Power, wave; Pump

U.S. Cl. X.R. 290-42; 417-521; 417-533

An oceanographic buoy having a self-sustaining power supply includes an elongate framework provided with a flotation section and a ballasting section predetermined to maintain the buoy in a vertical position. A pressure chamber carried on the buoy is fed water by a plurality of equidistantly, circumferentially disposed pumping assemblies and passes the water, under pressure, to a hydroelectric transducer driving a transmitter. The transmitter relays information, representative of a monitored phenomena, or, merely radiates high energy electromagnetic signals enabling the precise location of the buoy by a remotely disposed tracking station. High reliability stems from the overall simplicity of the oceanographic buoy which is primarily dependent on the configuration and orientation of the several pumping assemblies that individually require a minimum amount of sealing and linkage elements.



MARCH 16, 1971

3,570,252

CONSTRUCTIONAL WORKS

Henri C. Vidal, 17 Rue Armengaud,
92 Saint-Cloud, France

Original application Mar. 26, 1964, Ser. No. 354,947, now Patent No. 3,421,326, dated Jan. 14, 1969, Divided and this application Sept. 24, 1968, Ser. No. 762,033

Int. Cl. E02b 7/08; E02d 5/00

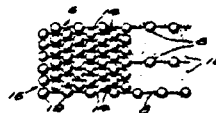
U.S. Cl. 61-30

11 Claims

Keywords: Bulkhead

U.S. Cl. X.R. 61-35; 61-39

Earth reinforcement constructed by assembling a mass of pulverulent material frictionally bonded by elongated frictional elements which extends through the mass of particles. The frictional elements include a flexible cable or wire having large radial projections such as balls secured on the cable at regular intervals along the length of the cable. The boundary of the mass of particles is confined by a wall built of layers of the frictional elements layed continuously in traversing courses on top of each other. At suitable intervals the elongated frictional elements extend outwardly from the wall into the mass of particles so that the particles fill the space between the reinforcing elements to provide a stable structure.



**3,570,253
CONSTRUCTIONAL WORKS**

Henri C. Vidal, 17 Rue Armengaud,
92 St. Cloud, France

Original application Mar. 26, 1964, Ser. No. 354,947, now
Patent No. 3,421,326, dated Jan. 14, 1969. Divided
and this application Jan. 13, 1969, Ser. No. 798,245
Int. Cl. E02b 7/06

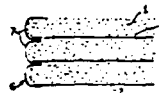
U.S. Cl. 61—35

10 Claims

Cladding for a mass of particles that are bound together solely by friction. The cladding is preferably in the shape of elongated channel members which have opposed side walls and a curved front wall. The curvature of the front wall is semi-elliptical. The side walls of adjacent channel members are superimposed on each other and the particles and channel members are retained by friction.

Keywords: Bulkhead

U.S. Cl. X.R. 61-39



**3,570,254
METHOD AND MEANS FOR PROTECTING AN
EARTH SURFACE AGAINST SCOUR**

Lee A. Turzillo, 2078 Glengary Road,
Bath, Ohio 44313

Filed Jan. 17, 1969, Ser. No. 792,175

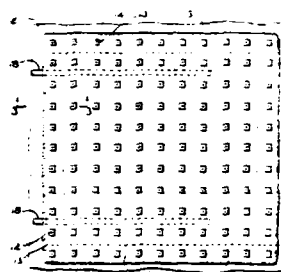
Int. Cl. E02b 3/12

U.S. Cl. 61—38

17 Claims

Method and means for forming protective liner body on an earth situs. Porous fabric formed and/or shaped in one of a number of ways as closed container about quantity of loose filler material, such as aggregate. Pressurized, hydraulic cement mortar pumped into formed container to permeate the filler material and expand anchoringly restrained container walls, until fluid mortar oozes through fabric pores. Fluid hardens into solid liner body with filler material discretely dispersed therein.

Keywords: Concrete form; Fabric mat; Low-cost shore protection; Revetment; Slope protection



**3,570,256
INFLATABLE BERTH**

Kenneth L. Thompson, Huntington Beach, Calif., assignor
to Ye Dock Master, Inc.

Filed July 15, 1969, Ser. No. 841,704

Int. Cl. B63c 1/00; E02c 3/00

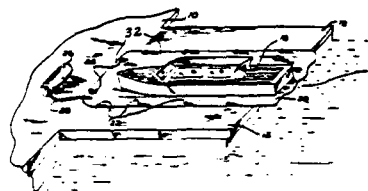
U.S. Cl. 61—48

6 Claims

An inflatable berth for covering the water-submerged portion of a boat hull, comprising an inflatable, water-proof, flexible envelope, having a quilted interior surface adapted to generally conform to the configuration of a boat hull, and means for inflating the envelope for close contact of the quilted surface with the boat hull whereby to entrain water against the hull for stagnation of the entrained water.

Keywords: Fouling prevention; Small-craft mooring device

U.S. Cl. X.R. 61-64; 114-222



3,570,257

DOCK AND DOLPHIN PROTECTOR

Grant W. Walker, 4339 Lancey Court, Sacramento, Calif.,
and Duane B. Ford, 2811 Hocking St., Placerville,
Calif. 95667

Filed Sept. 17, 1968, Ser. No. 760,143

Int. Cl. E02b 3/22

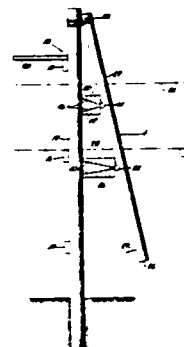
U.S. Cl. 61—48

1 Claim

A protector for fixed marine structures such as docks, dolphins, etc., which comprises a movable shaft pivotally mounted at one end and freely movable at the other and at least one non-energy storing energy absorption unit between the fixed marine structure at the shaft, the energy absorbing unit comprising a plurality of hollow bodies formed of mildly resilient material normally filled with water and having an orifice which is sized and disposed to permit escape of water from the body at a limited rate commensurate with the severity of impact of a vessel against the movable shaft is disclosed.

Keywords: Pier fender; Pile dolphin

U.S. Cl. X.R. 114-219; 293-1



3,570,437

MULTI-CYCLE OCEAN DATA GATHERING SYSTEM

Paul D. Davis, Jr., Garland, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Feb. 11, 1969, Ser. No. 798,355

Int. Cl. B63g 9/00; B63b 21/52

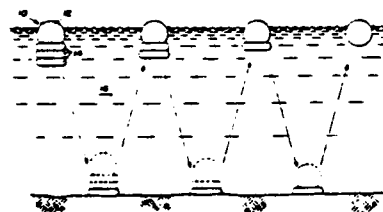
U.S. Cl. 114—16

2 Claims

A system for repetitively submerging and surfacing an ocean data gathering instrument package. The system includes a number of vessels each large enough to contain sufficient water to sink the instrument package and the remaining vessels. The package is submerged by flooding one of the vessels and is surfaced by detaching the flooded vessel from the package and the remaining vessels. The package may be submerged as many times as there are vessels in the system.

Keywords: Buoy, instrumented; Instrument deployment

U.S. Cl. X.R. 9-8



MARCH 23, 1971

3,572,042

**PROCESS FOR FORMING A PLASTIC FILL SHEET
ON OCEAN FLOOR SILT**

Thorndyke Roe, Jr., Oxnard, Calif., assignor to the United States of America as represented by the Secretary of the Navy

Filed Oct. 6, 1969, Ser. No. 864,222
Int. Cl. E02b 3/12, 29/06

U.S. Cl. 61-36

2 Claims

Keywords: Seabed material placement;
Seabed soil treatment

U.S. Cl. X.R. 61-7

A resin solution is fed through an extrusion head disposed underwater and in close proximity to the sediment of the ocean floor. The solution is formed of a sea water insoluble resin-plasticizer system dissolved in a sea water insoluble solvent, the resin-plasticizer system of the solution having a relatively high specific gravity greater than 1.0 so that, when the system precipitates in the sea water, it drops onto the sediment. Preferably, the extrusion head is moved along at a controlled rate to form a continuous sheet of a desired thickness.

No Figure

3,572,043

UNDERWATER STRUCTURE

Ernest A. Charn, Los Angeles County, Calif. (GMM Associates
12150 Stagg St. North Hollywood, Calif. 91605)
Filed Feb. 24, 1969, Ser. No. 801,341
Int. Cl. B63b 35/44, 21/00

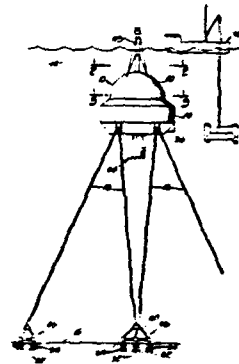
U.S. Cl. 61-46

14 Claims

Keywords: Offshore platform anchor; Off-
shore platform, floating

U.S. Cl. X.R. 9-8

An underwater structure comprising a buoyant housing immersed in a body of water and an anchoring system connected between the housing and the floor of the body of water and cooperating with the fluid pressure of the water to maintain the housing in a stable position a predetermined distance above the floor. The housing is an inverted, generally cup-shaped structure having an open bottom portion, and the anchoring system comprises a plurality of tiedown legs having their upper ends attached to the housing and their lower ends anchored to the floor of the body of water in which the housing is immersed. The tiedown legs are preferably hollow tubular members sealed to prevent water from entering the interior thereof, and of such dimensions as to be relatively weightless in water and of neither negative nor positive buoyancy. The lower ends of the tiedown legs are anchored to the floor of the body of water in which the housing is immersed by means of rods which extend into cavities in the floor and are bonded thereto by grout. An exemplary use of the underwater structure of this invention, an aquadome, is for housing drilling equipment and/or personnel for recovery of petroleum and natural gas from offshore oil fields.



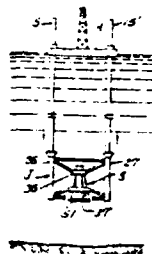
3,572,044
MULTIUNIT OFFSHORE PLATFORM
 Ivo C. Pogonowski, Houston, Tex., assignor to Texaco Inc.,
 New York, N.Y.

Filed Mar. 24, 1969, Ser. No. 809,320
 Int. Cl. E02b 17/02, E21b 7/12

U.S. Cl. 61-46.5 6 Claims

The invention relates to an offshore platform for use in relatively deep water, being equipped for exploratory purposes and/or for producing crude oil from a subsurface wellhead. The platform comprises a floatable hull section that detachably engages an intermediary jacket. The latter supportedly rests on or near the floor of a body of water and incorporates a removable wellhead structure. After use of the platform for drilling and completion operations at a well site, the jacket and wellhead structure are separated whereby the latter will remain at the site, while the jacket is removed by the hull for further use. The jacket is then raised from the ocean floor by the floatable hull for transfer to another well site.

Keywords: Offshore platform, jack up;
 Seabed oil, process structure



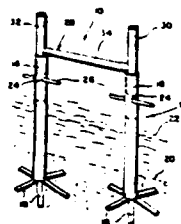
3,572,045
PIER ASSEMBLY
 Clifford L. Owen, Hines, Minn.
 Filed Oct. 15, 1968, Ser. No. 767,716
 Int. Cl. E02b 3/22

U.S. Cl. 61-48 7 Claims

A pier assembly includes pairs of tubular pier supporting posts. The lower ends of the posts are slit to form feet which are bent to extend laterally outwardly and which are provided with a slight twist so that the posts may be screwed securely into the ground. H-shaped pier deck supporting members have vertical legs telescopically received in the tubular posts and crossmembers for supporting the pier deck. Angle brackets for supporting pier joists or stringers may also be provided on the vertical legs adjacent the crossmember. A tire casing is mounted on the posts and vertical legs to serve as a boat bumper.

Keywords: Pier fender; Pier, fixed; Pier, mobile; Pile footing; Small-craft pier; Tires

U.S. Cl. X.R. 114-219; 248-156; 248-188.8



3,572,129
FREE-FALL BOTTOM SAMPLER
 Thomas N. Walthier, San Diego, André Marcel Rosfelder,
 La Jolla, and Clifford E. Schatz, San Diego, Calif.,
 assignors to Bear Creek Mining Company, Salt Lake
 City, Utah

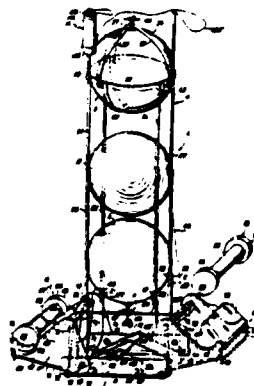
Filed Mar. 8, 1968, Ser. No. 711,792
 Int. Cl. G01n 1/08

U.S. Cl. 73-425.2 21 Claims

A bottom sampler to obtain a sample of the bottom of a body of water. A pair of clam shell jaws are pivotally connected to the base of an upright frame of the sampler. Hollow buoyant spheres are retained within the upright portion of the frame. The jaws are latched in an open position against the bias of resilient elements which close the jaws when the latch is released in response to impact with the bottom. Two weights, one on the back of each jaw stabilize the sampler during descent and fall off when the jaws close. A camera located within one of the hollow spheres photographs the bottom of the body of water from which the sample is taken. A unique signal-flare and smoke producing device automatically actuates when the sampler returns to the surface. Other day or night signal devices such as a radio or flasher can also be used and provision is made to attach such devices to the sampler.

Keywords: Sampler, seabed grab

U.S. Cl. X.R. 37-187



MARCH 30, 1971

3,572,462
APPARATUS FOR AND METHOD OF SEISMIC
EXPLORATION
Joseph C. Gray, 4131 Turnberry Circle, Houston, Tex.
Filed Jan. 7, 1969, Ser. No. 789,558
Int. Cl. G01v 1/04

U.S. Cl. 181-0.5

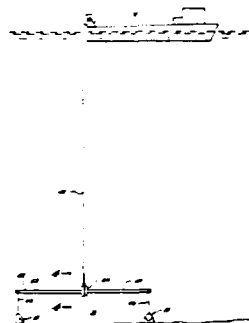
4 Claims

Apparatus for use in seismic exploration comprising energy propagating means for directing energy downwardly vertically into an earth formation and means for receiving and recording such energy reflected vertically upwardly from a sub-surface bed or strata. The apparatus includes an energy source housing of generally dome shape adapted to be placed in a downwardly opening position on the bottom, and within which an energy source may be discharged to generate a vertically downwardly directed force against the sea floor, and a receptor or seismometer housing also of generally dome shape adapted to be similarly positioned on the sea bottom to receive vertically upwardly reflected energy from subsurface strata.

The invention also includes a method of seismic exploration which comprises propagating vertically downwardly directed energy at the earth's surface and receiving and recording the vertically upwardly reflected energy from a subsurface formation, to provide information concerning the location and character of such formation.

Keywords: Seismic explosive acoustic
transmitter; Seismic hydrophone;
Seismic survey method

U.S. Cl. X.R. 340-7; 340-15.5



3,572,506
UNDERWATER STORAGE TANK
William J. Bandy, Jr.; William K. E. Morris, and Grant M.
Stainbrook, Akron, Ohio, assignors to the United States
of America, as represented by the Secretary of the Interior
Filed Feb. 14, 1969, Ser. No. 799,454
Int. Cl. B01d 21/24

U.S. Cl. 210-86

6 Claims

This invention relates to an underwater storage tank for the temporary storage of liquids such as overflow storm water. The tank consists of top and bottom walls with at least the top wall being a flexible and collapsible membrane made of rubber or similar material and a metal framework of piping to which the membranes are secured. The structure is placed in position on the bottom of a lake, for example, and is connected, by means of an inlet-outlet pipe, to a sewer system. The pipes of the metal framework include jets which are connected to a source of liquid under pressure which can be used for flushing the tank. The tank also includes a cover for the inlet-outlet pipe which assists in discharging large pieces of sediment and also assists in removing the same from the tank. The tank also includes vent valves for the escape of gases which may evolve while the sewage is in the tank and furthermore includes means for determining the volume of the tank at any given time.

Keywords: Offshore storage tank, submerged;
Seabed water, process structure

U.S. Cl. X.R. 210-120; 210-170; 210-242;
210-251



3,572,839
PROCESS FOR EXCAVATION OF HARD UNDERWATER BEDS

Saburo Okabe, Tokyo, Japan, assignor to Toa Kowan Kogyo Kabushiki Kaisha, Chiyoda-ku, Tokyo, Japan
Filed Aug. 28, 1968, Ser. No. 756,032
Int. Cl. E21c 45/00

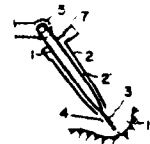
U.S. Cl. 299-17

2 Claims

Keywords: Dredge, cutterhead

U.S. Cl. X.R. 37-195; 175-67

A process for excavating hard underwater beds characterized in that compressed air is ejected around jets of high pressure water so as to blow off existing water from the peripheries of said water jets thereby to enhance the excavating efficiency of said hydraulic jets.



APRIL 13, 1971

3,574,298
FIRING DEVICE, METHOD, AND SYSTEM, FOR SEISMIC EXPLORATION

Richard R. Larson, Ulster Park, N.Y., assignor to Hercules, Incorporated, Wilmington, Del.
Filed Apr. 21, 1969, Ser. No. 818,475
Int. Cl. F42d 3/06

U.S. Cl. 102-22

29 Claims

Keywords: Seismic explosive acoustic transmitter

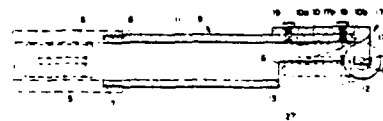
U.S. Cl. X.R. 102-73; 181-.5

The invention provides:

1. a firing device for underwater seismic shooting small delay-type percussion-initiatable charge assemblies including (a) means for sequentially conveying such charge assemblies into, or along, a path of forward travel for percussion initiation, (b) means in said path of travel for interception-contact, while in a stationary position, with the forwardly moving charge assemblies to cause percussion initiation of same by resulting impact, and (c) means for directing the thus-initiated charge assemblies, during the delay period, from the system for subsequent detonation;

2. an underwater seismic exploration method including the steps of (a) sequentially conveying such delay-type charge assemblies into or along the above said path of travel, (b) sequentially impacting said assemblies during their travel to provide the percussion initiation, and (c) during the delay period, sequentially directing travel of the thus-initiated charge assemblies away from the zone of percussion initiation into an adjacent underwater area for detonation; and

3. a system for generating seismic disturbances in an underwater zone including (a) a movable platform, such as a boat deck, (b) a firing device, above described, as a submersed firing station, and (c) means for delivering such charge assemblies under force of fluid pressure from the boat deck to the firing station, including a delivery conduit and pressure generation means therefor.



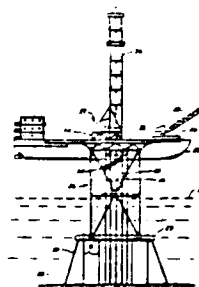
3,575,005
METHOD AND APPARATUS FOR OFFSHORE
OPERATIONS

Maurice N. Sumner, #1 Chelsea Place, Houston, Tex.
Filed June 29, 1967, Ser. No. 649,889
Int. Cl. E02b 17/04; E02d 21/00; B63c 7/04
U.S. Cl. 61-46.5 25 Claims

In the erection of offshore structures, preferred method steps including releasably securing a vessel adapted for water navigation to a structure, said structure being adapted to be stabilized at selected locations of various depths wherein stabilization enables mineral-related, military, and transportation apparatus to function from said structure, altering the elevation of the vessel with respect to the structure whereby the vessel is made more free of wave action at the altered elevation and thereafter restoring the vessel to a navigable relationship to the body of water; said invention including apparatus for supporting a separable structure wherein the support immediately below the structure is designed principally with support of the structure in view and extends downwardly to a footing member, wherein support members below said footing member are founded in the soil beneath the body of water and are designed principally as foundation members.

Keywords: Offshore construction; Offshore platform, jack up; Pile placement; Seabed foundation

U.S. Cl. X.R. 61-65; 114-5; 114-43.5; 175-7; 175-9



APRIL 27, 1971

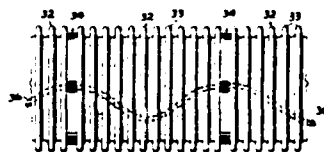
3,576,108
MARINE OIL BOOM

Douglas H. Rowland, P.O. Box 30465, Dallas, Tex. 75230
Continuation-in-part of application Ser. No. 829,006, May 29, 1969. This application Sept. 3, 1969, Ser. No. 854,911
Int. Cl. E02b 15/04

U.S. Cl. 61-1 7 Claims

Elongated sections of flexible buoyant tubes are connected together in end-to-end relation for extending offshore along a coastline surrounding an oil tanker or an oil well location. The wall of the tube sections is formed in accordion-pleated fashion for readily conforming to variations in the surface of the supporting water. Anchor means maintains the assembled tubes in approximate location while other means prevents longitudinal expansion of the tubes beyond the yield point of their material.

Keywords: Pollutant, surface barrier



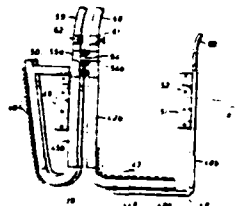
3,576,111
UNDERWATER PIPELINE-BURYING APPARATUS
Urban A. Henry, Jr., P.O. Box 643, Morgan City, La.
Filed July 3, 1968, Ser. No. 742,465
Int. Cl. F16l 1/00; E02f 5/02

U.S. Cl. 61-72.4 20 Claims

The apparatus includes a framework of tubular members adapted to straddle the pipeline to be buried and to be supported thereon for movement along the pipeline. High-pressure jets of water directed ahead of the framework wash away the bottom below the pipeline and form a trench into which the pipeline can fall. High-pressure jets of water directed rearwardly of the framework move the framework along the pipeline. The volume of water flowing to the propulsion jets is controlled, preferably, by a diver riding the framework to control the speed at which the framework is propelled along the pipeline, as dictated by the rate the bottom sediments and silt are removed from beneath the pipeline ahead of the framework.

Keywords: Seabed pipeline placement; Seabed trencher

U.S. Cl. X.R. 37-80



3,576,220

TELESCOPING SEA FLOOR SOIL SAMPLER

Henry L. Gill, Ojai, Calif., assignor to the United States of America as represented by the Secretary of the Navy.

Filed Apr. 1, 1969, Ser. No. 813,403

Int. Cl. E21b 7/12, 49/02; G01n 1/02

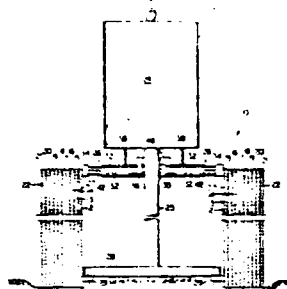
U.S. Cl. 175-6

12 Claims

A deep-penetrating ocean bottom soil sampler employing a plurality of telescoping tubes that may be sequentially driven downwardly to penetrate the ocean floor a distance equal to approximately one-half of the cumulative length of the tubes. As the sampler with extended tubes is withdrawn, it extracts an elongate core comprising a representative ocean bottom soil sample.

Keywords: Sampler, seabed-driven core

U.S. Cl. X.R. 175-20; 175-58



3,576,257

FLUID SEPARATION DEVICE

Robert L. Yates, Santa Clara, Calif., assignor to Lockheed Aircraft Corporation, Burbank, Calif.

Filed Mar. 18, 1970, Ser. No. 20,638

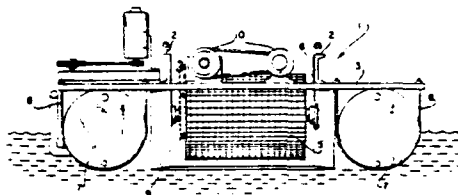
Int. Cl. B01d 17/02

U.S. Cl. 210-242

10 Claims

A device for separating fluids having different physical properties is disclosed which utilizes a unique drum having a plurality of substantially horizontal vanes for "concentrating" in a relatively quite space a quantity of the fluid to be recovered while simultaneously utilizing the forces of surface tension and adhesion of such fluid to cause it to cling to a rotatable disc from which the fluid is scraped and allowed to flow into a central trough from whence it can be recovered, and further processed.

Keywords: Pollutant, mechanical removal; Pollutant removal watercraft



MAY 4, 1971

3,577,340

METHOD FOR DISPERSING OIL SPILLS ON WATER

Stanley C. Paviak, Shaler Township, Warren K. Porter, Jr., Richland Township, Allegheny County, Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

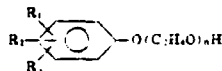
No Drawing. Filed Apr. 16, 1970, Ser. No. 29,295

Int. Cl. B01d 17/04

U.S. Cl. 210-42

9 Claims

A method for dissipating oil spills in water by dispersing the spilled oil with a novel alkylphenol ethoxylate having the structural formula



wherein n is an integer from about 5 to about 25, R_1 is an alkyl group having at least 20 carbon atoms and R_2 and R_3 are independently selected from said alkyl group and hydrogen; and mixtures of the same.

Keywords: Pollutant dispersion

U.S. Cl. X.R. 252-312; 252-351

No Figure

3,577,738

**APPARATUS FOR INJECTING SAND BENEATH
SUBMERGED CONSTRUCTIONS**

Kaj Havno, Copenhagen, Denmark, assignor to Christiani &
Nielsen A.S. Copenhagen, Denmark

Filed June 9, 1969, Ser. No. 831,302

Claims priority, application Denmark, June 18, 1968,

2854/68

Int. Cl. E02d 3/12, 27/00

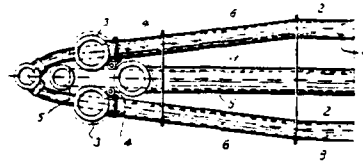
U.S. Cl. 61-63

4 Claims

Apparatus for injecting sand under a construction or excavation in the water in which the construction is temporarily suspended or rests on temporary supports comprising combined feed and suction lines each having a branch adapted to extend beneath the construction and a branch extending vertically above the surface of the body of water, means for reciprocating or oscillating the branches beneath the construction and including a feedpipe through which a mixture of sand and water can be pumped into the space below the construction, and at least one suction pipe through which a corresponding quantity of water can be extracted or withdrawn from the space into which sand and water are being deposited, and at least a flushing feedpipe through which water can be forcibly ejected to flush suspended or partially deposited lightweight materials

Keywords: Offshore construction; Seabed material placement

U.S. Cl. X.R. 61-35; 61-50



MAY 11, 1971

3,577,879

FLOATING BARRIER MEANS

Roger Eugene Ducrocq, Colombes, France, assignor to Pneumatiques, Caoutchouc Manufacture Et Plastiques Kleber-Colombes, Colombes, France

Filed July 10, 1969, Ser. No. 840,724

Claims priority, application France, July 10, 1968, Dec. 31, 1968, 158914; 182534

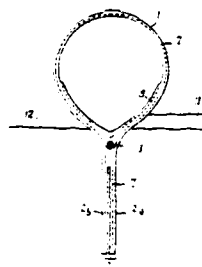
Int. Cl. E02b 15/04

U.S. Cl. 61-1

6 Claims

This invention relates to barrier elements used, for example, for restraining oil slicks and the like on the surface of the sea. In such a barrier that comprises an inflatable tube and a skirt connected thereto, the invention provides that the skirt consists of two flexible members each of which constitutes an elementary skirt; means are provided to connect together these elementary skirts by their upper portions and the lower portions of the skirts are split vertically, the splits being uniformly spaced apart and the splits in one elementary skirt being offset relatively to those in the other; at least one flexible mechanical reinforcing element is located in the upper portion of the skirt and this flexible reinforcing element may be located in a channel

Keywords: Pollutant, surface barrier

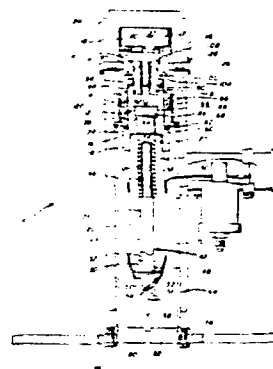


3,577,949
**EXPLOSIVELY PROPELLED UNDERWATER
 EMBEDMENT ANCHOR ASSEMBLY**
 Kenneth E. Mueller, Baltimore City; John L. Critcher,
 Cockeysville; Franklin A. Monson, Glenarm; William H.
 Turnbaugh, Cockeysville, and John E. Kosloski, Timonium,
 Md., assignors to the United States of America as
 represented by the Secretary of the Navy
 Filed June 19, 1968, Ser. No. 740,817
 Int. Cl. B63b 21/28, 21/26, F41c 27/00
 U.S. Cl. 114-206 12 Claims

An explosively propelled underwater embedment anchor assembly having a barrel with a smooth bore therethrough except for an internal flange near the muzzle extremity, a breech at the other end of the barrel, an explosive propellant cartridge within the barrel and adjacent the breech, a piston also within the barrel and adjacent the breech but on the muzzle side thereof, the piston having an outside diameter approximately equal to the diameter of the smooth bore, and a harpoon adjacent the piston and extending out of the barrel, the harpoon having a maximum outside diameter approximately equal to the inside diameter of the flange. A spring-biased firing pin is restrained by a plurality of ball lock detents held in place by a resiliently biased tube.

Keywords: Embedment anchor

U.S. Cl. X.R. 42-1; 89-1.34; 227-11



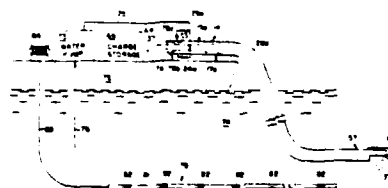
3,578,101
**CHARGE LOADER DEVICE, SYSTEM, AND METHOD
 FOR UNDERWATER SEISMIC EXPLORATION**
 Richard R. Larson, Ulster Park, N.Y., assignor to Hercules
 Incorporated, Wilmington, Del.
 Continuation-in-part of application Ser. No. 818,475, Apr.
 21, 1969. This application Nov. 4, 1969, Ser. No. 873,875
 Int. Cl. F42d 3/06 22 Claims

U.S. Cl. 181-5XC

A device for loading small explosive charges for delivery to an underwater seismic shooting site over prolonged periods with greater regularity of sequence and higher rate of delivery than possible heretofore is provided which comprises a housing, and an open passageway extending therethrough and including a constricted throat portion and an adjacent frustoconical expansion section together with means for conveying fluid into the throat for generation of Venturi type pressure lowering as the source of suction force for drawing the small charges, inserted into the open passageway end, through the throat and expansion section for delivery to the site.

Method and system (1) for such loading of small charges, (2) for firing said charges and (3) for measurement of resulting seismic disturbances for a seismic record, are also provided.

Keywords: Seismic explosive acoustic transmitter; Seismic survey method



3,578,171
**APPARATUS FOR REMOVING FLOATING
 POLLUTANTS**

David Usher, 9010 Roselawn Ave., Huntington Woods,
 Detroit, Mich. 48204

Filed Apr. 2, 1969, Ser. No. 812,780

Int. Cl. B01d 21/00

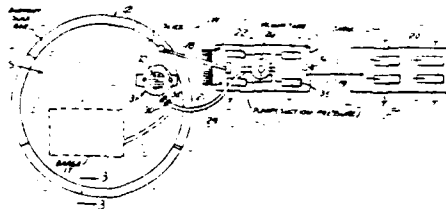
U.S. Cl. 210-242

3 Claims

Apparatus for removing oil and other floating pollutants from a body of water employing a barge which consists of means for encompassing a slick and confining it to prevent lateral spreading, skimming and withdrawing the pollutant under vacuum to a storage area on a barge, pumping into settling tanks and simultaneously siphoning off the water; and transporting a barge and its pollutant removal equipment by one from the group consisting of air, truck and rail, to any remote point for emergency use

Keywords: Pollutant collection; Pollutant removal watercraft; Pollutant, suction removal; Pollutant, surface barrier

U.S. Cl. X.R. 210-513



3,578,585
**METHOD OF REMOVING FLOATING OIL FROM
 THE SURFACE OF A BODY OF WATER**

Robert L. Yahnske, Munster, Ind., assignor to Standard
 Oil Company, Chicago, Ill.

Continuation of application Ser. No. 672,294, Oct. 2,
 1967. This application Mar. 24, 1969, Ser. No. 809,524

Int. Cl. B01d 15/02, 33/02

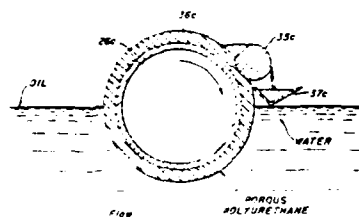
U.S. Cl. 210-30

4 Claims

A rotating cylinder covered with a layer of porous polyurethane absorbs oil flowing on a body of water, and a roller squeezes absorbed oil from the layer into a collecting trough.

Keywords: Pollutant, mechanical removal

U.S. Cl. X.R. 37-72; 254-172



MAY 25, 1971

3,579,872
**DREDGING APPARATUS WITH SURGE
 COMPENSATING MEANS**

Robert J. Jantzen, Baltimore, Md., assignor to Ocean Science
 and Engineering, Inc., Washington, D.C.

Filed Nov. 5, 1968, Ser. No. 773,613

Int. Cl. E02f 3/90

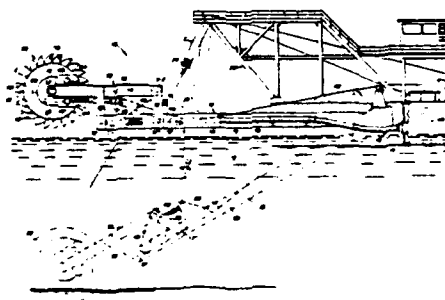
U.S. Cl. 37-66

8 Claims

A dredging system including a floating vessel, a ladder pivotally connected to the vessel and capable of being lowered to selected angular positions with respect to the vessel, an excavator at the free end of the ladder for digging and removing material, and a surge compensator on the ladder for adjusting the length of the ladder in response to changes in distance between the vessel and the material being dredged.

Keywords: Dredge, cutterhead; Dredge intake; Dredge ladder control

U.S. Cl. X.R. 37-72; 254-172



3,579,994
BARRIER FOR CONTROL OF SUBSTANCES IN BODIES
OF WATER

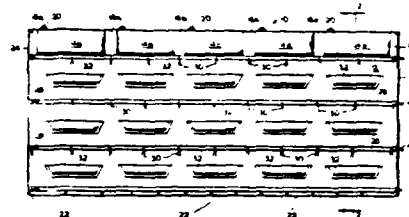
Paul Preus, Smith Road, and Charles E. Rosendahl, Flag
Point, Toms River, N.J.
Filed Jan. 17, 1969, Ser. No. 792,074
Int. Cl. E02b 15/04

U.S. Cl. 61-1

3 Claims

A barrier for control of waterborne substances having a plurality of units interconnected to one another in end to end relationship. Each unit has articulated flotation chambers and a flexible, depending skirt with permanent ballasting along the lower edge thereof. Means are provided to selectively reef the skirt and water ballasting pockets are formed on the skirt to provide restraint against wind action on the barrier.

Keywords: Pollutant, surface barrier



3,579,996
PORTABLE BOAT RAMP
Jerry W. Edson, Wichita, Kans. (R1 Clearwater, Kans.
67026)

Filed Sept. 5, 1969, Ser. No. 855,623
Int. Cl. B63c 11/00, 3:12

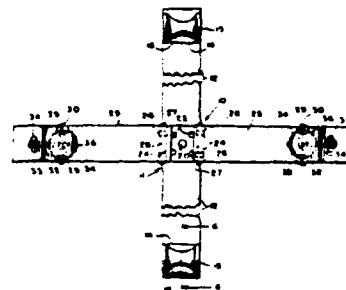
U.S. Cl. 61-66

7 Claims

A portable boat ramp for beaching or launching small boats which eliminates the need to drag such boats across a sandy or rocky beach with resulting damage to the hull. The ramp may be conveniently carried manually and is capable of being quickly adjusted between an extended operative position and a folded position for storage or transportation. Adjustable bolsters are provided for engaging hull sides of different configurations and cooperate with a stabilizing bar which is disposed therebeneath to provide a stable support for a boat while supported on the ramp.

Keywords: Small-craft launcher

U.S. Cl. X.R. 61-67



3,580,202
FLOATING WHARF STRUCTURE
Kenneth L. Thompson, Huntington Beach, Calif., assignor to
Ye Dock Master, Inc.

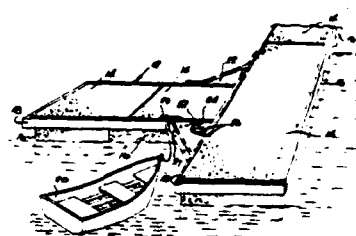
Filed Mar. 11, 1969, Ser. No. 806,249
Int. Cl. B63b 35/00

U.S. Cl. 114-0.5

9 Claims

A floating wharf structure wherein interconnected walkways are provided spaced from the top surfaces of supporting pontoons. Each of the walkways comprises a flat sheet of wire mesh screen and spacing means are defined by reinforcing bars disposed downwardly from the sheet. The screen and bars are encased in concrete shaped to define the walkway and integral spacing means. The walkways are interconnected by flanges extending downwardly from the walkways to contralaterally flank underlying pontoons. Each pontoon comprises walls of concrete defining a chamber and polymer foam filling the chamber.

Keywords: Pier, floating; Small-craft pier



3,581,273

MARINE SEISMIC EXPLORATION

Ronald M. Hedberg, 18 Whittier St., Cambridge, Mass.
Continuation of application Ser. No. 645,643, June 13, 1967.
This application Nov. 10, 1969, Ser. No. 875,510
Int. Cl. G01v 1/38

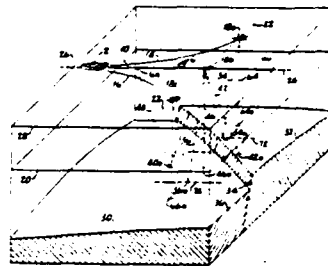
U.S. Cl. 340-7PC

13 Claims

Continuous marine seismic explorations are carried out by providing echo detecting means with control means for maintaining the echo detecting means in fixed or predetermined positions and at spaced points in two dimensions of a horizontal plane, and by generating echo producing impulses at one or more spaced points located in fixed or predetermined relative positions with respect to each other and in said plane. In this way, a set of records may be obtained which define the seismic interfaces of the prospect under survey in two intersecting vertical planes. Thereafter, by producing successive sets of such records, quadratic surfaces in which the true inclinations of interfaces may be determined over an extended area are obtained in a single traverse thereof. At the same time, the accuracy of the records obtained is materially increased.

Keywords: Seismic hydrophone array;
Seismic survey method

U.S. Cl. X.R. 114-237; 181-0.5VM; 340-15.5MC



JUNE 1, 1971

3,581,505

A METHOD OF ENCASING A PARTIALLY SUBMERGED STRUCTURE

Orval E. Liddell, P.O. Box 1533, Avalon, Calif.
Filed June 27, 1969, Ser. No. 837,259
Int. Cl. B63b 59/00; E02d 29/00

U.S. Cl. 61-46

3 Claims

A protective covering for a submerged structure such as a boat, drydock, barge, float, pier, bulk head, and the like. The covering includes a pliable generally waterproof sheet and attachment means for securing spaced portions of the sheet to the surface of the structure to be protected whereby the sheet will resist deterioration of the structure. A novel method of installing the protective covering utilizing a plurality of buoyancy units is disclosed. The use of such buoyancy units permits the covering to be readily maneuvered underneath a floating structure so that the structure may be easily covered in situ.

Keywords: Coating; Fouling prevention

U.S. Cl. X.R. 114-222



3,581,508

UPLIFT PILE ANCHORAGE STRUCTURE

Ralph W. Junius, 501 Jewel St., New Orleans, La.
Filed Aug. 18, 1969, Ser. No. 850,803
Int. Cl. E02d 5/30, 5/22

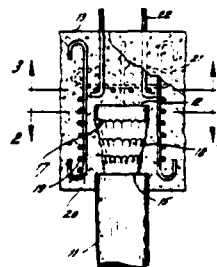
U.S. Cl. 61-53

4 Claims

An uplift pile anchorage structure having a wooden pile with a truncated section cut near the upper end thereof. The upper end of the wooden pile including the truncated section is surrounded by a reinforcing cage and imbedded in a concrete cap. The cap may take form of a large concrete mat having a plurality of such pile structures imbedded therein.

Keywords: Pile, structure connection;
Pile, wood

U.S. Cl. X.R. 52-297; 61-56



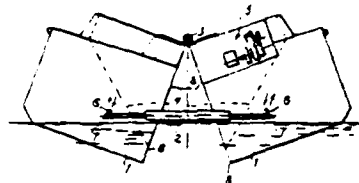
3,581,694
**LONGITUDINALLY SPLIT BARGES WHICH ARE
 INTERCONNECTED BY MEANS OF HINGES**
 Kjell Werenskiold, Bekkestua near Oslo, Norway, assignor to
 Ingenior F. Selmer A/S, Oslo, Norway
 Filed Mar. 5, 1969, Ser. No. 804,501
 Int. Cl. B63b 35/30

U.S. Cl. 114-29

2 Claims

The present invention relates to an improvement in longitudinally split dump barges where the two barge halves are interconnected by hinges so that by means of one or more pressure cylinders, the two halves may be pivoted away from and towards each other. The pressure cylinder comprises two double acting pistons with oppositely directed piston rods which at their free ends are hinged at a suitable distance below the interconnecting hinges of the barge. When the barge is opened, only the strong cylinder shell is exposed in the gap opening between the barge halves, the piston rods with the finely polished surfaces being protected inside the two barge halves.

Keywords: Hopper barge



3,581,899
**APPARATUS FOR SEPARATING OIL FROM WATER
 SURFACE**
 Raymond E. Hunter, Lomita, Calif., assignor to Ocean Design
 Engineering Corporation, Long Beach, Calif.
 Filed Apr. 8, 1970, Ser. No. 26,666
 Int. Cl. B01d 15/02

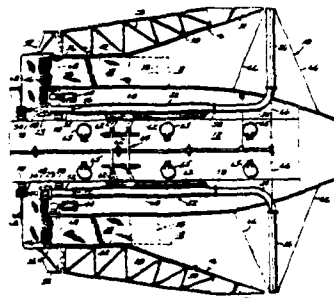
U.S. Cl. 210-242

6 Claims

An apparatus for separating oil from a water surface by distributing many small buoyant bodies of oil absorbent material upon such surface, continuously lifting such bodies from the surface, treating the bodies to remove the absorbed oil, and again distributing the bodies upon the surface for reuse. The apparatus preferably includes booms for gathering the distributed bodies of absorbent material toward a conveyor which lifts the bodies upwardly. The booms are articulated and include floats so that the booms rise and fall with any wave action of the water, such as would exist in the unprotected waters of the open sea. The apparatus also preferably includes a system for compressing the oil from the bodies, and thereafter dropping the bodies onto the water surface for recycling.

Keywords: Pollutant absorption; Pollutant collection; Pollutant, mechanical removal; Pollutant removal watercraft

U.S. Cl. X.R. 210-DIG 21



3,582,034
**MOLD FOR CASTING A BREAKWATER CONCRETE
 BLOCK**
 Yoshiro Tsuzuki, No. 808, Seijo-Cho Setagaya-ku, Tokyo,
 Japan
 Filed Jan. 6, 1969, Ser. No. 794,840
 Int. Cl. E02b 1/00

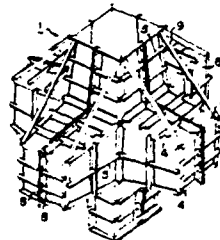
U.S. Cl. 249-10

5 Claims

A mold for casting breakwater concrete blocks defining a block having a central hexahedron body and six symmetrically spaced legs radiating from the six surfaces of said body, each of said legs being in the form of a truncated pyramid, said mold being divided into symmetrical mold portions along two symmetrical planes, each of said planes including an axis of said mold, each of said portions being provided with flanges along its periphery adapted to permit the joining of said portions.

Keywords: Concrete armor unit; Concrete form

U.S. Cl. X.R. 25-118R; 61-4; 249-160

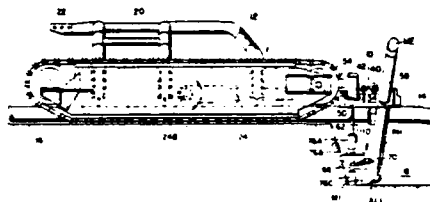


JUNE 8, 1971

3,583,170
SUBMERGED PIPELINE ENTRENCHING APPARATUS
AND CONTROL SYSTEMS FOR SAME
Douwe DeVries, 20 Tennyson Place, New Orleans, La.
Filed Jan. 28, 1969, Ser. No. 794,574
Int. Cl. B63b 35/04; E02f 5/02
U.S. Cl. 61-72.4 21 Claims

Keywords: Seabed pipeline placement;
Seabed trencher

Pipeline-entrenching systems and apparatus are provided for progressively entrenching submerged pipelines. Pneumatically driven trenching cutters and material exhaust apparatus of the airlift type are coordinated such that the exhaust from the pneumatic cutter drive activates the material exhaust apparatus to remove material from a trench cut effected by the cutters at a rate proportional to the cutter speed. The cutters and exhaust apparatus are mounted on an adjustable platform structure that is operated from an above-surface vessel and includes an adjustable pipeline engaging and follower mechanism which is adaptable to a wide range of pipeline diameters. The cutters and exhaust apparatus are so mounted on the adjustable platform device as to be constrained to effect a trench cut of a conforming depth and size for each specific pipeline diameter encountered to assure uniform trenching depths for the top-line of the pipeline regardless of the pipeline diameter.

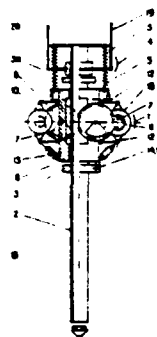


3,583,497
AN IMPROVED VIBRATING POWER HAMMER FOR
DRIVING AND EXTRACTING PILES
Bohdan Kossowski, Sopot, Chopina 9; Czesław Gawlik,
Gdynia ul. Gwoltkego 42 m 2; Adam Hlibowicki, Sopot ul.
Abrahama 28a m 15, all of Poland
Filed Dec. 23, 1968, Ser. No. 786,302
Claims priority, application Poland, Dec. 29, 1967, 124410
Int. Cl. E02d 7/18
U.S. Cl. 173-49 5 Claims

Keywords: Pile driver, vibratory; Pile
extractor

U.S. Cl. X.R. 74-61

A vibrating power hammer having a vibrator consisting of rotatable eccentrics mounted on a pile casing. Motors are provided to positively rotate the eccentrics in opposite directions. The motors are mounted to be isolated from the vibration of the vibrator in a substantially constant position with respect thereto.

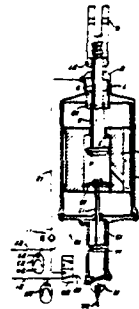


3,583,499
HYDRAULIC PILE EXTRACTOR
 Hugo Cordes, Gr. Brunnenstr. 78, Hamburg 50, Germany
 Filed Sept. 9, 1969, Ser. No. 856,387
 Int. Cl. E02d 7/00
 U.S. Cl. 173-131 7 Claims

Keywords: Pile extractor

U.S. Cl. X.R. 173-91; 173-132

A pile extractor of the type having a housing suspended from a crane, a ram reciprocable within the housing, and a pulling member having an impact head adapted to be secured to a pile and movable longitudinally in the housing. A cylinder supplied with hydraulic fluid is attached to the top of the housing, having a piston and piston rod movable within the hydraulic cylinder, the piston rod is connected to the ram, and the ram has a longitudinal through bore into which the pulling member extends, a step in the bore forms an impact face for the head of the pulling member accommodated within the bore. An hydraulic accumulator connected to the hydraulic fluid feed line is an integral part of the cylinder. In the preferred modification the pulling member is provided with a shaft and piston movable in a compensating cylinder attached to the bottom of the housing, the compensating cylinder being provided with hydraulic fluid from the hydraulic fluid feed line.



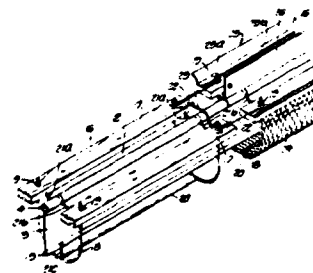
JUNE 15, 1971

3,584,462
**APPARATUS FOR GATHERING AND CLEANING
 WATER SURFACES OF POLLUTION**
 Phillip Stephen Gadd, Vancouver, British Columbia, Canada,
 assignor to Roy F. Gadd, Huntington Park, Calif.
 Filed Sept. 12, 1969, Ser. No. 857,357
 Int. Cl. E02b 15/04
 U.S. Cl. 61-1 12 Claims

Keywords: Pollutant collection; Pollutant
 debris; Pollutant, surface
 barrier

U.S. Cl. X.R. 210-170; 210-242

Apparatus for gathering and cleaning water surfaces of pollution, debris, and the like, which comprises an elongated floating boom structure which protectively supports a flexible curtain having float means secured along an upper edge and weight means along a submerged edge, the float means and weight means being connected by slack chains to adjacent portions of the floating boom structure so as to maintain the curtain in an effective operating and working position, and wherein the boom structure mounts protective shielding screens for the curtain, and additionally includes upstanding baffles connectable with float means and/or the floating boom structure. In a modified arrangement, pairs of boom structures support a common curtain therebetween, the curtain being secured along its side edges and being downwardly curved to provide an elongate trough or sluice.

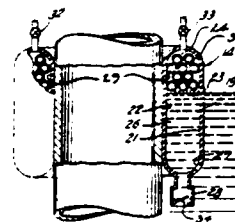


3,584,464
INFLATABLE MARINE FENDER
 Fuad T. Saadeh, and Ivo C. Pogonowski, both of Houston,
 Tex., assignors to Texaco Inc., New York, N.Y.
 Filed June 27, 1969, Ser. No. 837,066
 Int. Cl. E02b 3/22
 U.S. Cl. 61-48 7 Claims

The invention relates to an inflatable fender for a marine structure, being so carried on the latter to receive and absorb the shock of a floating vessel or other object as the latter makes contact with the structure. The fender includes a shock-absorbing element adapted to not only absorb the impact of the floating body but to dissipate the force of the impact and recover for a subsequent impact. A second, supporting element includes an inflatable belt of sufficient length to surround a platform support leg. The support element includes an expandable wall which, upon inflation, extends laterally to form an annular, tight grip against the outer surface of the support leg. Thereafter with the fender supported in place, the shock-absorbing element can be provided for as needed.

Keywords: Collision protection; Offshore structure fender

U.S. Cl. X.R. 114-219

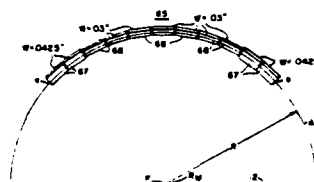


3,585,579
SIDE LOOKING SONAR TRANSDUCER
 John A. Dorr, Baltimore, Md., and John H. Thompson, Pittsburgh, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.
 Filed July 9, 1969, Ser. No. 840,163
 Int. Cl. H04r 17/00
 U.S. Cl. 340-9 13 Claims

A side looking sonar transducer having an elongated active radiating, or receiving, surface which is wider at the ends of the transducer than at the middle. This arrangement provides an energy distribution which allows for a greater depth of focus.

Keywords: Sonar, side looking

U.S. Cl. X.R. 340-10



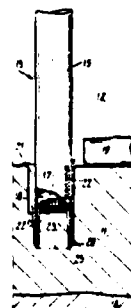
JUNE 22, 1971

3,585,738
METHOD AND APPARATUS FOR SUCTION DREDGING
 Jan De Koning, Amsterdam, Netherlands, assignor to N. V. Ingenieursbureau voor Systemen en Octrooien Spanstaal, Rotterdam, Netherlands
 Filed Oct. 7, 1968, Ser. No. 765,416
 Claims priority, application Netherlands, Oct. 16, 1967, 67.14007
 Int. Cl. E02f 3/92, 3/94
 U.S. Cl. 37-57 11 Claims

The relatively hard layer of clay which covers an underwater body of sand is penetrated rapidly by forcing the lower end of a suction-dredging pipe assembly into the layer while drawing water through the pipe at a sufficiently rapid rate as to erode the clay and form a core of clay in the lower end of the pipe. This core may be removed either by crushing same so that the flowing water rapidly washes it away, or by periodically maintaining suction on the pipe to retain the core, withdrawing the pipe from the hole and expelling the core, whereafter the operation is repeated until the body of sand is reached.

Keywords: Dredge, suction; Dredge intake

U.S. Cl. X.R. 37-58; 37-61; 37-195;
 175-6; 175-20; 175-405; 302-15; 302-58



3,585,739
**METHOD AND SUCTION DREDGING INSTALLATION
 FOR OBTAINING SAND**

Jan De Koning, Amsterdam, Netherlands, assignor to N. V. Ingenieursbureau voor Systemen en Octrooien Spanstaak, Rotterdam, Netherlands

Filed Oct. 7, 1968, Ser. No. 765,420

Claims priority, application Netherlands, Oct. 16, 1967, 67.14009

Int. Cl. E02f 3/88, 3/92, 3/94

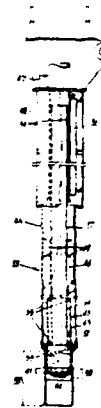
U.S. Cl. 37-58

6 Claims

In dredging sand, an inner pipe is movable longitudinally within an outer jacket so that the lower end of the inner pipe may be projected beyond the lower end of the jacket and retracted within the jacket. Suction is maintained on the inner pipe and water under pressure is supplied to the jacket so that, when retracted, the lower end of the inner pipe draws in a mixture of sand and water entering the lower end of the jacket to provide the desired suspension in the pipe. In intermediate positions, the lower end portion of the inner pipe blocks the lower end of the jacket but the lower end portion of the inner pipe is formed to communicate the lower end of the inner pipe with the water under pressure in the jacket.

Keywords: Dredge, suction; Dredge intake

U.S. Cl. X.R. 37-57; 37-195; 175-403; 302-15; 302-58



3,585,740
**METHOD AND SUCTION DREDGING INSTALLATION
 FOR SUCKING UP DREDGING SPOIL**

Jan De Koning, Amsterdam, and Tjako Aaldrik Wolters, Utrecht, both of, Netherlands, assignors to N.V. Ingenieursbureau voor Systemen en Octrooien, Rotterdam, Netherlands

Filed Oct. 7, 1968, Ser. No. 765,415

Claims priority, application Netherlands, Oct. 16, 1967, 67.14006

Int. Cl. E02f 3/88, 3/92

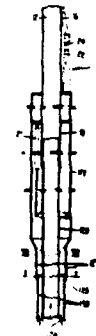
U.S. Cl. 37-63

3 Claims

In dredging sand from an underwater body of sand, the lower end of a suction pipe is inserted into the sand and water under pressure is introduced into the pipe at a level above the lower end of the pipe while suction is maintained at the upper end of the pipe to withdraw a suspension of sand in water having a desired concentration of sand in it which is less than the concentration entering the lower end of the pipe. To lessen the energy required to maintain the suction, the relation between the pressure of the water introduced and the level of its introduction is controlled so that the predetermined concentration of sand exists in the pipe above such level while the level lies well below the top of the body of sand and relatively close to the lower end of the pipe.

Keywords: Dredge, suction; Dredge intake

U.S. Cl. X.R. 37-195; 302-15; 302-58



3,585,801
OFFSHORE TOWER

Albert M. Koehler, Houston, Tex., assignor to Brown & Root, Inc.

Filed Feb. 20, 1970, Ser. No. 13,122

Int. Cl. E02b 17.00, E02d 21.00

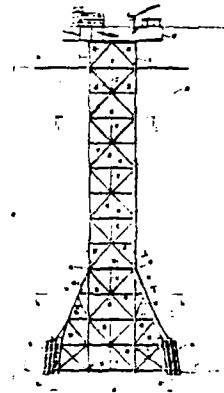
U.S. Cl. 61-46.5

12 Claims

Keywords: Offshore construction; Offshore platform, fixed

U.S. Cl. X.R. 61-52

A tower suitable for use in offshore well operations and the like and including a plurality of generally vertical columns extending from the bed of a body of water to a position above the surface of the body of water for supporting a platform thereupon. A quaternary batter brace system is connected to the generally vertical columns in a position intermediate the ends of the columns and beneath the surface of the body of water. Piling jacket clusters are connected to the free end of each of the batter brace members and are designed to rest upon the bed of the body of water. A plurality of piles extend through the batter piling jacket clusters and pin the offshore tower to the bed of the body of water. A reinforcing lattice connects adjacent batter brace members and pile jacket clusters solely on opposite sides of the vertical columns. The region between alternate batter braces and pile jacket clusters on opposite sides of the vertical columns are free of inner connecting reinforcing structure.



3,585,802
DOCKING AND FENDERING SYSTEM

Ernst G. Frankel, Boston, Mass., assignor to Litton Systems, Inc., Beverly Hills, Calif.

Filed July 16, 1969, Ser. No. 842,172

Int. Cl. E02b 3/20, 15/02, 3/00

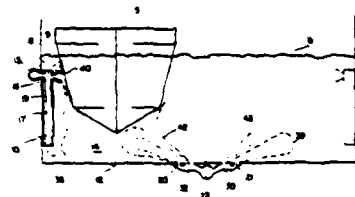
U.S. Cl. 61-48

7 Claims

Keywords: Pier fender

U.S. Cl. X.R. 61-1; 61-6; 114-230

A docking and fendering system for aiding in the directional guidance and fendering of vessels in channels, wells or along piers. Guidance of the vessel is achieved by hydraulic or pneumatic submerged jets directed against the sides of the vessel to direct or fender the vessel. The jets can be entirely water, air, or a mixture and are located along the wall or pier from which the vessel is to be fendered and submerged at a distance outboard from the dock so as to provide a lateral thrust on the vessel.



3,585,803

PILE SPLICE

John J. Bardgett, Orleans Parish, La., assignor to Esso Production Research Company

Filed Nov. 15, 1968, Ser. No. 776,013

Int. Cl. E02d 5/52; F16l 21/00

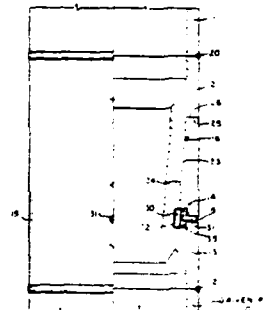
U.S. Cl. 61-53

5 Claims

Keywords: Pile section connection; Pile, steel

U.S. Cl. X.R. 285-308; 285-321

A machined pile splice for use in construction of offshore platforms. A box member is attached to a pile member before it is driven. A pin member is attached to the pile section to be added. A shear ring is located in opposing recesses in both the box and pin members. The shear ring is made slightly wedge-shaped in cross section and is initially installed in the box member where it is held centered by a corrugated spring strip. The box member is also provided with thread studs which force the shear ring into tight contact with the lower surface of the pin member recess and upper surface of the box member recess. The outer surface of the pin member and the inner surface of the box member are tapered. The tip of the pin member passes through the shear ring and outer wall of the pin member contacts the inner wall of the shear ring. As the tapered pin member continues through the shear ring, the ring is forced to increase in diameter which forces the ring deeper into the box member recess. After the pin member is fully inserted into the box member, the shear ring snaps out of the box member and into the opposing pin member recess. The thread studs are screwed in, forcing the wedge-shaped shear ring into tighter contact with the lower surface of the pin member recess and the upper surface of the box member recess. An O-ring is provided between the pin and box members to provide a fluid seal.



3,585,952

SELF RIGHTING VESSEL

Victor P. Head, Cranbury, N.J., assignor to RCA Corporation

Filed Jan. 28, 1969, Ser. No. 794,588

Int. Cl. B63h 9/00; B63b 43/02

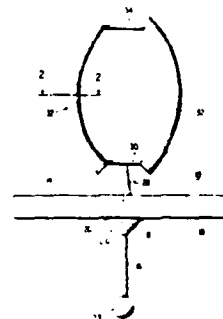
U.S. Cl. 114-39

5 Claims

Keywords: Buoy, instrumented

U.S. Cl. X.R. 114-122

A self-righting vessel is provided in which flotation means, which may comprise the sail of a sailing vessel, is so positioned and proportioned to the vessel that no matter what position the vessel assumes as the result, for example, of winds or waves, the vessel will right itself.



J.586,469
**PROCESS OF BURNING-OFF OIL ON THE SURFACE OF
 WATER BASINS**

Alexis Molin, Saltsjobaden, and Osten Carlsson, Nacka, both
 of, Sweden, assignors to Atlas Copco Aktiebolag, Nacka,
 Sweden

Filed Dec. 26, 1968, Ser. No. 786,976
 Claims priority, application Sweden, Jan. 5, 1968, 175/1968
 Int. Cl. F23c 5/00

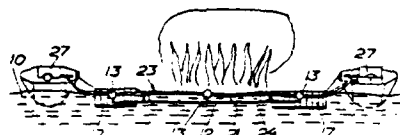
U.S. Cl. 431-8

7 Claims

Keywords: Pollutant collection; Pollutant
 removal watercraft; Pollutant,
 surface barrier; Pollutant burning

U.S. Cl. X.R. 210-63

Method and means are presented for destroying drifting oil
 layers on the surface of water basins by sustained combustion
 in a zone contiguous to the oil layer and in relative motion
 with respect thereto. In the method for thus combating drift-
 ing oil, a plurality of jets of combustion sustaining gas, in par-
 ticular compressed air, are blown against the oil layer in said
 zone for sustaining combustion therein. In the combating
 means a hollow element is connected to a source of pressure
 gas, in particular compressed air, and kept afloat at the sur-
 face of the water with longitudinally spaced discharge
 openings on the element blowing the pressure gas against the
 oil layer in said zone for sustaining combustion therein.



JUNE 28, 1971

J.587,308
WATER WAVE MONITOR
 James W. Tucker, Falls Church, Va., and Thomas H. Cosden,
 Lothian, Md., assignors to United States of America as
 represented by the Secretary of the Navy

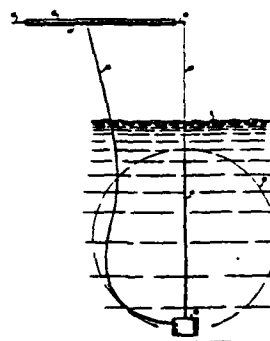
Filed May 5, 1969, Ser. No. 821,750
 Int. Cl. G01f

U.S. Cl. 73-170

6 Claims

Keywords: Wave measurement

A device for measuring waveheights from less than one-
 tenth of an inch to many feet by the use of a single thin wire
 probe. Waveheight is determined by the conductance
 between the thin wire and the body of water which is propor-
 tional to the length of wire immersed and therefore to the in-
 stantaneous waveheight.



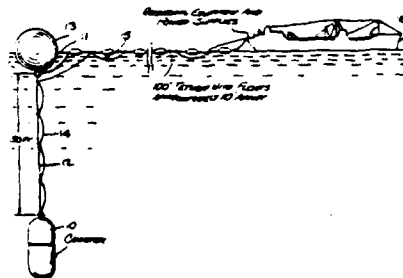
3,587,309
AERO-HYDRO INTERFACE MEASURING SYSTEM
 Robert E. Jasperson, Annapolis, Md., assignor to Trident
 Engineering Associates, Inc., Annapolis, Md.
 Filed June 12, 1969, Ser. No. 832,579
 Int. Cl. G01c 13/00

U.S. Cl. 73-170

8 Claims

A wave measuring system in which an accelerometer sensor is sealed within a canister suspended by a long lead well below the surface of the sea from a flotation buoy, whereby perturbation of the buoy by wave action is transferred to the canister to produce accelerometer readings which are a function of wave activity.

Keywords: Instrument, towed; Wave measurement



3,587,310
HOLLOW CORE INSTRUMENT CABLE
 Daniel N. Brown, San Diego, Calif., assignor to the United
 States of America as represented by the Secretary of the
 Navy

Filed Oct. 29, 1969, Ser. No. 872,267
 Int. Cl. G01d 1/00

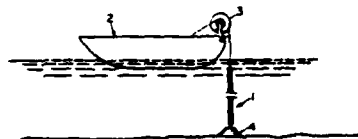
U.S. Cl. 73-170A

4 Claims

A hollow core conduit is wound on a winch or storage reel aboard an oceanographic vessel and the conduit is of sufficient length to extend from the vessel to a submerged position preferably on the ocean floor where it is anchored. The fact that the conduit is formed with a hollow core permits an oceanographic instrument, such as a bathythermograph probe, to be run up and down the conduit when the conduit is disposed in a vertical disposition between the reel and the ocean floor. Temperature sensing thus can be achieved for all depths and the sensed data transmitted by a telemetering line which supports the probe to a recorder or other apparatus aboard the vessel. The conduit itself includes a flexible and porous exterior casing member formed of a braided ropelike material and a coil spring elastically engaging the interior wall of the casing member throughout its length to provide bulkhead strength sufficient to maintain the hollow core shape of the conduit over a desired range of conduit loads. The braided casing member is used to couple the ends of the conduit to the reel and the anchor so that the entire tensile load is borne by this casing with the interior spring relatively free to move.

Keywords: Bathythermograph; Instrument cable; Instrument deployment

U.S. Cl. X.R. 138-127

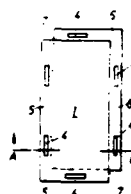


3,587,503
MEANS FOR CONSTRUCTING BUOYANT PLATFORMS
 Eugen Stehr, Hindenburgdamm 55, Berlin, Germany
 Filed Mar. 6, 1969, Ser. No. 804,843
 Int. Cl. B63b 35/00; E02b 17/00
 U.S. Cl. 114—0.5 **4 Claims**

The invention provides means for constructing a single or multilayer buoyant platform from individual buoyant units which are designed on a modular basis and which can be coupled together edgewise by complementary tongues and grooves and face-to-face through self-aligning openings.

Keywords: Offshore construction; Pier, floating

U.S. Cl. X.R. 61-48



3,587,874
BOAT-SUPPORTING AND LAUNCHING DEVICE
 Edwin H. Graf, W187-S6876 Jewel Crest Drive, Muskego, Wis.
 Filed Aug. 8, 1969, Ser. No. 848,639
 Int. Cl. B63c 3/02
 U.S. Cl. 214—1-A **3 Claims**

A ramp is positioned on a shore with one end in the water, and has a winch on its shore end, the support being furnished by a footing member resting on the shore and having spaced-apart upwardly projecting roller assemblies. The frame of the ramp comprises spaced outer longitudinals having lower surfaces which engage on the spaced rollers, there being a center longitudinal which projects below the outer longitudinals to fit between the rollers, and there being boat keel supporting rollers between the outer longitudinals and over the upper edge of the center longitudinal. There are also longitudinally projecting hull-guiding rollers intermediate the length of the ramp.

Keywords: Small-craft launcher

U.S. Cl. X.R. 61-67; 193-35

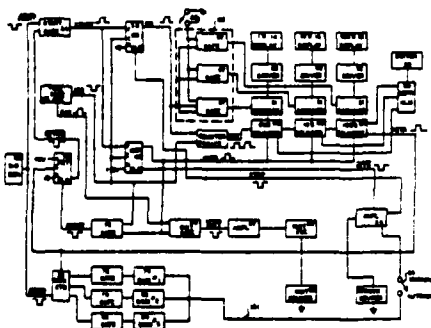


3,588,795
DEPTH INDICATOR
 Stathis G. Linardos, Clearwater; Richard F. Elmhurst, and William A. Elmhurst, Largo, Fla., assignors to Lykes Bros. Incorporated, Systems & Engineering Division, Clearwater, Fla.

Filed Feb. 27, 1969, Ser. No. 802,998
 Int. Cl. G01s 9/68
 U.S. Cl. 340—3 **11 Claims**

A solid-state indicator for indicating a depth of water featuring a digital readout display which is accurate, easily read, and draws a minimum amount of current. The indicator includes an automatic gain that is automatically stepped upwardly together with a newly transmitted sound wave when a previous sound wave has still not been received. Also provided is an automatic alarm that is simply actuated by connecting the alarm to the digital outputs of the counters. The alarm is set at a particular depth and is sounded whenever the counters are stopped by a reflected sound wave at a depth of water below this setting.

Keywords: Sonar, depth sounder



65

JUNE 29, 1971

3,589,040
MECHANISM FOR ANTICIPATING THE
CONCENTRATION OF SAND IN A DREDGING
SUSPENSION

Jan De Koning, Amsterdam, and Romke Van der Veen,
Jutphaas, both of, Netherlands, assignors to N. V. In-
genieursbureau voor Systemen en Octrooien "Spanstaal",
Rotterdam, Netherlands

Filed May 15, 1968, Ser. No. 729,229

Claims priority, application Netherlands, May 24, 1967,

67,07167

Int. Cl. E02f 3/38

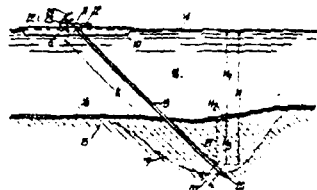
U.S. Cl. 37-58

2 Claims

In underwater dredging, the ambient pressure in the soil or sand being dredged adjacent the tip of the dredging pipe which is buried in the sand is used to control the dredging machinery so that the output of dredged material is increased. A pressure sensitive device is used to anticipate variations in concentration of the sand in the suspension of sand in water being dredged.

Keywords: Dredge, suction; Dredge intake;
Dredge-spoil measurement

U.S. Cl. X.R. 73-299



3,589,133
METHOD OF AND MEANS FOR MOUNTING
EQUIPMENT AT A SUBSEA LOCATION

Judson D. Lowd; Ernest C. Hill, and Bill S. Burrus, all of Tui-
sa, Okla., assignors to Combustion Engineering, Inc., New
York, N.Y.

Filed May 15, 1969, Ser. No. 824,790

Int. Cl. B63c 11/00

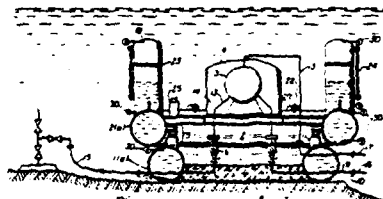
U.S. Cl. 61-46.5

4 Claims

A structure for mounting equipment at a subsea location has a platform member and an anchor member, each with independently adjustable buoyancies. The two members are interconnectable and can be nested together for towing to their emplacement site, at which their buoyancies are sequentially adjusted, the anchor positioned, and the platform winched down and secured to the anchor. The platform is retrievable to the surface without an external power assist. The anchor member may also be retrieved if external power is available to blow the anchor ballast.

Keywords: Seabed foundation; Seabed
oil, process structure

U.S. Cl. X.R. 61-69; 114-16



JULY 6, 1971

3,590,406
LONG SPAR BUOY

George S. Lockwood, Jr., Carmel Valley, and Klemme M. Jones, San Pedro, both of Calif., assignors to Global Marine Inc., Los Angeles, Calif.

Filed May 22, 1968, Ser. No. 731,156
Int. Cl. B63b 21/52

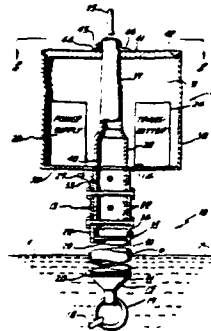
U.S. Cl. 9-8

5 Claims

An oceanographic long spar buoy including a plurality of elongated tubular members connected to each other in an end-to-end relationship to define a body of the buoy. A weatherproof data handling instrumentation container is demountably secured to an upper unsubmerged end of the body. The instrumentation container houses equipment which is coupled to instrument transducers mounted at selected locations along the buoy. The container is removable as a unit from the buoy for ease of servicing or repair of the contents thereof.

Keywords: Buoy, instrumented

U.S. Cl. X.R. 73-170



3,590,408
ANCHORING DEVICE FOR A FLOATING BUOY

Cornelis M. Verhagen, Heemstede, Netherlands, assignor to Datawell N.V., Haarlem, Netherlands

Filed Feb. 24, 1969, Ser. No. 801,349

Claims priority, application Netherlands, Mar. 1, 1968,

6,803,005

Int. Cl. B63b 21/52; H01b 1/00, 7/06

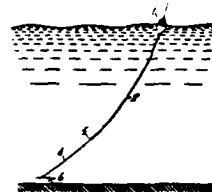
U.S. Cl. 9-8

3 Claims

The invention relates to an anchoring means for connecting a buoy with a fixed point below the water surface, which anchoring means contains at least over part of its length an elongated elastic member that can be elongated over 100 percent and consists of natural rubber mixed with polybutadiene and/or a plasticizer, and is able to withstand at least 30,000 elongations of more than 100 percent without tearing or breaking. The anchorage means according to the invention enables the use of smaller buoys that nevertheless are not submerged by current and waves.

Keywords: Buoy mooring system; Instrument cable

U.S. Cl. X.R. 174-9; 174-69; 174-70



3,590,584

FLOATING OIL CONFINING APPARATUS

Hugh J. Fitzgerald, Austin, and Ernest H. Koepf, Dallas, both of Tex., assignors to Ocean Pollution Control, Inc., Dallas, Tex.

Filed Dec. 5, 1969, Ser. No. 882,638

Int. Cl. B01d 21/02; E02b 15/04

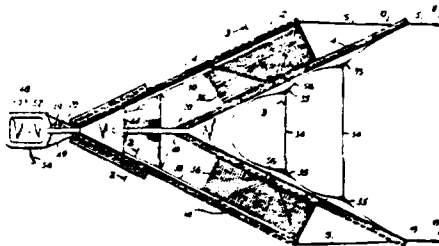
U.S. Cl. 61-1

10 Claims

Apparatus for collecting oil from the surface of a body of water having two V-shaped assemblies of flexible inflated floats, one arranged 5 to 25 feet leewardly of the other on the same central axis, whereby the wind and current drive the oil into the open end of the assemblies and cause it to be funneled rearwardly to their apices. Each V-shaped assembly is provided with a depending skirt of impermeable sheet material, the lower edges of the skirts at either side of the inner assembly being interconnected by shock cords and the lower edges of the skirts on the outer assembly being connected to the inner assembly by netting.

Keywords: Pollutant collection; Pollutant, suction removal; Pollutant, surface barrier

U.S. Cl. X.R. 61-5; 210-242



3,590,585

COMPOSITE STRUCTURE

Jan G. De Winter, Enschede, Netherlands, assignor to Shell Oil Company, New York, N.Y.

Filed Apr. 22, 1969, Ser. No. 818,369

Claims priority, application Great Britain, Apr. 24, 1968,

Apr. 24, 1968, 19375/68; 19376/68

Int. Cl. E02b 3/04, 8/04, D02g 1/18

U.S. Cl. 61-3

7 Claims

An improved form of "artificial seaweed" for combating coastal erosion and the like comprises an anchored array of seaweed elements which are buoyant, water-resistant filamentary strands, preferably of foamed, stretched polyolefin having an internal plexiform structure surrounded by a substantially closed, thin skin. The structure as manufactured has water-decomposable filaments, such as of polyvinyl alcohol, interwoven at spaced intervals with the water-resistant seaweed elements to provide a more easily handled and transportable composite article. In a preferred mode, the lower ends of the seaweed elements are interwoven with transverse, water-resistant filaments to provide a fabric, preferably in tubular form, which is readily attached to an anchoring element or converted into an anchoring element by being filled with cement or sand.

Keywords: Artificial seaweed

U.S. Cl. X.R. 28-76



3,590,587

FLOATING PLATFORM WITH HORIZONTALLY MOVABLE COLUMNS

August Hendrik Maria Smuiders, Wassenaar, Netherlands, assignor to N. V. Industriële Handelscombinatie, Rotterdam, Netherlands

Filed June 16, 1969, Ser. No. 833,499

Claims priority, application Netherlands, June 17, 1968,

68,08497

Int. Cl. E02b 17/00; E02i 9/04; B65b 21/50

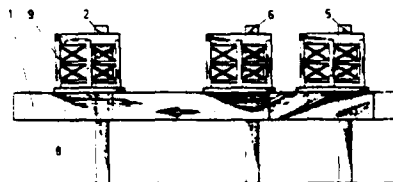
U.S. Cl. 61-46.5

2 Claims

A floating platform comprises a pontoon and more than three vertical supporting columns which are individually vertically movable relative to the pontoon and are also individually horizontally movable relative to the pontoon so that the pontoon may be moved horizontally over small distances without the need for refloating it.

Keywords: Offshore platform, jack up; Offshore platform, walking

U.S. Cl. X.R. 37-73; 115-9



3,590,589

APPARATUS FOR BURYING PIPELINES

August Hendrik Maria Smulders, Wassenaar, Netherlands, assignor to N. V. Industriële Handelscombinatie, Rotterdam, Netherlands

Filed June 16, 1969, Ser. No. 833,439

Claims priority, application Netherlands, June 17, 1968, 6,808,498

Int. Cl. E02f 5/06, 5/12; F16l 1/00

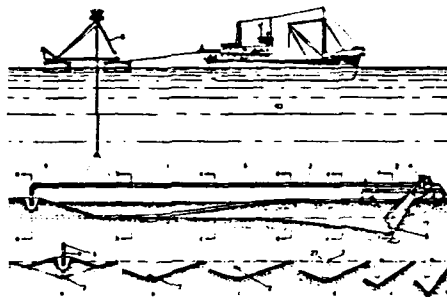
U.S. Cl. 61-72.4

6 Claims

Apparatus for burying pipelines combines a suction dredge for sand with an endless digger for clay. When the digger is used, the sand dredge is somewhat raised to remove the clay and also an auxiliary suction dredge is used for cleaning the digger, as well as a device for bevelling the edge of the dug trench so that the pipeline will settle into it.

Keywords: Seabed pipeline placement; Seabed trencher

U.S. Cl. X.R. 37-60; 37-69; 37-83; 37-86



3,590,635

PYCNOCLINE FOLLOWER APPARATUS

Walter O. Duing, Miami, Fla., assignor to the United States of America as Represented by the Secretary of the Navy.

Filed May 1, 1970, Ser. No. 33,755

Int. Cl. G01f 23/10

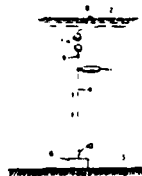
U.S. Cl. 73-170 A

7 Claims

Observation and study of internal waves in the main pycnocline of an ocean area is achieved by providing a pycnocline follower capable of being prebalanced to a particular density within the range of a predetermined density gradient of the pycnocline. As internal wave conditions produce density variations the pycnocline follower moves up and down. A time-related pressure-recorder system carried by the follower provides data on the varying pressure which closely corresponds to the amplitude and period of the internal-wave-producing the movement. The follower is mounted on a thin wire that is anchored, buoyed and tensioned sufficiently to maintain a vertical disposition in the presence of anticipated horizontal currents. A plurality of spherical buoyant members are removably mounted in a casing of the follower to permit weight changes necessary to prebalance the follower to a desired density. The recording system is carried by one of the buoyant members.

Keywords: Buoy, instrumented; Buoy mooring system; Depth pressure measurement; Instrument deployment

U.S. Cl. X.R. 73-300



JULY 13, 1971

3,591,936

SUBMARINE CUTTER DREDGER

Wouter Van Guens, Menton, France, assignor to Koninklijke Maatschappij tot het uitvoeren van openbare werken "Adriaan Volker" N. V., Rotterdam, Netherlands
Filed Jan. 15, 1969, Ser. No. 791,261
Int. Cl. E02f 3/88, 9/04

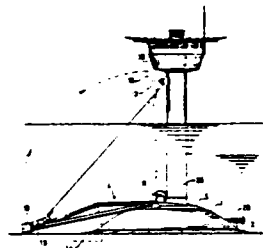
U.S. Cl. 37-56

4 Claims

A submersible dredge including a dome-shaped body to rest on the bottom of a waterway and having a vertical air shaft to atmosphere. The dome is formed in part by a rotatable annular mounting to which one end of a ladder is pivotally mounted, and on the other end of the ladder is a soil digging tool forward of one end of a suction tube. A driving motor for the tool is mounted on the ladder at the tool, above the inlet end of the suction tube, the latter being connected to a pump within the body. Two oppositely disposed sets of legs are provided to propel the dredge on the bottom of a waterway, the sets being operated alternately and each comprising three legs including one pair which are vertically movable and horizontally shiftable together, the other leg being in effect a prop.

Keywords: Dredge, cutterhead; Dredge propulsion; Dredge, submerged

U.S. Cl. X.R. 37-67; 37-73; 61-46



3,592,005

OIL BARRIER FOR OFFSHORE OIL RIGS

Eugene C. Greenwood, Newport Beach, Calif., assignor to Fre-Dei Engineering Corporation, Santa Ana, Calif., a part interest

Filed Feb. 25, 1969, Ser. No. 801,985

Int. Cl. E02b 15/04

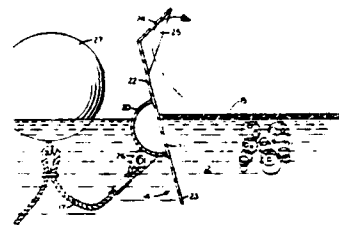
U.S. Cl. 61-1

10 Claims

A floating barrier is anchored in place in a generally circular shape around an offshore oil rig. The barrier consists of a plurality of rigid segments extending above and below the surface of the water and attached to each other by flexible couplings which permit movement in both horizontal and vertical planes. At each joint, a sheet of flexible material seals the joint from an interchange of oil and water from the inside of the barrier to the outside.

Keywords: Pollutant, surface barrier

U.S. Cl. X.R. 61-5



3,592,006

ISOLATION DEVICE

Arturo M. Cruet, Oklahoma City, Okla., assignor to Cerebro-Dynamics, Incorporated, Oklahoma City, Okla.
Filed Feb. 18, 1969, Ser. No. 800,201

Int. Cl. B63b 35/00

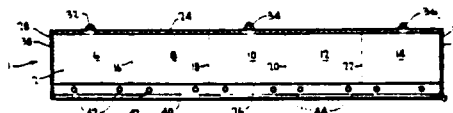
U.S. Cl. 61-1

11 Claims

A buoyant isolation device is provided which is capable of confining contamination (e.g. an oil slick) present upon the surface of a body of water while conforming in configuration to surface undulations. The device comprises a buoyant elongated flexible barrier which is provided with a plurality of closed fluid chambers. Through the use of a coupling element having a pair of slots which engage the barrier, contamination confined by the barrier may be readily concentrated prior to subsequent removal.

Keywords: Pollutant, surface barrier

U.S. Cl. X.R. 114-0.5



3,592,007
RETAINER FOR FLOATING DEBRIS
 Carl E. Renner, 3824 Rachel, Port Arthur, Tex.
 Filed Sept. 5, 1969, Ser. No. 855,530
 Int. Cl. E02b 15/04

U.S. Cl. 61-1

8 Claims

A floating retainer for water carried debris of various types, including liquid debris such as oil from ships, offshore drilling operations, and the like. The retainer includes an elongated vertically orientatable gathering skirt, the upper edge of which defines an elongated pocket for the reception of buoyant float material. The lower edge defines a ballast-receiving pocket. Interengaging male and female ends are provided in conjunction with joining collars for the tying together of two or more retainers.

Keywords: Pollutant debris; Pollutant, surface barrier



3,592,008
FLOTATION CONFINEMENT APPARATUS
 Billie A. Trindle, 8712 S. Youngs, Oklahoma City, Okla.
 Filed May 23, 1969, Ser. No. 827,411
 Int. Cl. E02b 15/04

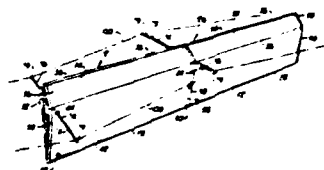
U.S. Cl. 61-1

1 Claim

A flotation confinement apparatus for disposition on a body of water which apparatus is particularly useful around offshore oil rigs and in cooperation with a shoreline to retain or to exclude oil or other undesirable matter until such matter can be removed or otherwise eliminated.

Keywords: Pollutant, surface barrier

U.S. Cl. X.R. 61-5



3,592,012
LATERALLY REINFORCED OFFSHORE PLATFORM
 George E. Mott, Metairie, La., assignor to Texaco Inc., New York, N.Y.
 Filed Sept. 23, 1969, Ser. No. 860,285
 Int. Cl. E02b 17/00

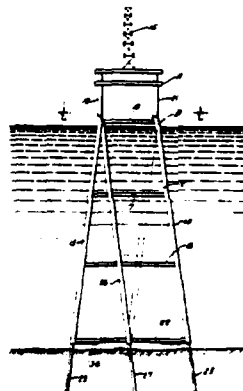
U.S. Cl. 61-46

5 Claims

An offshore platform adapted to be fixedly positioned at the floor of a body of water. The deck-supporting structure or jacket includes three or more corner legs which extend to, and are fastened into the substratum by piles connected at the respective leg's lower ends. The jacket's upper end is adapted to adjustably or fixedly position a work deck above the water's surface, which deck accommodates the usual equipment such as derricks, draw works and the like. Normally utilized in a well-drilling operation, the deck-supporting jacket is reinforced and stabilized against lateral displacing forces by a series of batter piles held in diagonally positioned pile guides disposed along the respective side faces of said support jacket.

Keywords: Offshore platform, fixed; Pile placement; Seabed foundation

U.S. Cl. X.R. 61-46.5

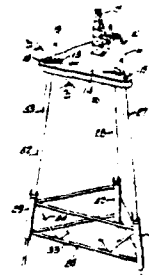


3,592,013
TILTING JACK OFFSHORE PLATFORM
 Ivo C. Pogonowski, Houston, Tex., assignor to Texaco Inc.,
 New York, N.Y.
 Filed June 24, 1969, Ser. No. 836,054
 Int. Cl. E02b 17/00
 U.S. Cl. 61-46.5 5 Claims

The invention relates to an offshore platform which includes a work deck having a derrick and other ancillary equipment, normally supported above the water's surface for drilling and producing an underwater well. The support member includes a plurality of elongated legs or columns which operably connect to the deck. Said legs are flared outwardly in a downward direction to define a broad base of substantially greater dimensions than the deck. The respective legs are anchored at their lower ends to the ocean floor and extend above the work deck. The latter can thereby be adjusted to a desired height above the water's surface, stabilized to a desired attitude, or lowered to the water's surface. Each leg is registered in a tiltable jack mechanism, which is in turn operably mounted to a mobile carriage whereby the leg upper end can be adjusted by either/or the tilting or longitudinal movement of said jacking mechanism.

Keywords: Offshore platform, jack up;
 Seabed foundation

U.S. Cl. X.R. 24-263

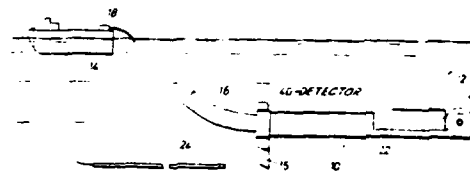


3,592,286
METHOD OF SEISMIC PROSPECTING
 Curtis H. Johnson, San Marino, Calif., assignor to Western
 Geophysical Company of America, Houston, Tex.
 Filed Sept. 11, 1969, Ser. No. 857,086
 Int. Cl. G01v 1/00
 U.S. Cl. 181-0.5 10 Claims

A method of seismic prospecting whereby explosive charges are detonated at any desired depth and the bubble-pulse train is permitted to form without hindrance. In a first embodiment of the invention the effects of the bubble are removed in the stage of processing of the recorded seismic data. In a second embodiment, the characteristic pulse train produced by the bubbles is used to enhance the quality of the resulting seismic data.

Keywords: Seismic explosive acoustic
 transmitter

U.S. Cl. X.R. 340-7; 340-15.5

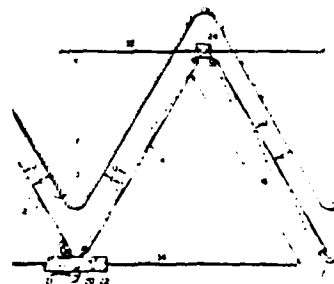


JULY 29, 1971

3,593,526
**APPARATUS AND METHODS FOR OIL SLICK
 CONTAINMENT**
 David Parks Hoult, 11 Cameron Road, Wayland, Mass., and
 James Alan Fay, 36 Spruce Hill Road, Weston, Mass.
 Filed June 4, 1969, Ser. No. 830,270
 Int. Cl. E02b 15/04
 U.S. Cl. 61-1 2 Claims

Apparatus and methods for oil slick containment in the open sea, in the presence of waves and currents, utilizing a submerged, segmented, pneumatic boom arranged in zigzag, accordion-pleated configuration in which the included angle between adjoining segments is between about 120° and 20°, with the minimum distance between adjacent apices greater than wave-caused water movement, the boom segments being submerged beneath the water surface at the predetermined depth d in which d/a is in the range of 5 to 10, a being the value of wave amplitude.

Keywords: Pollutant, surface barrier

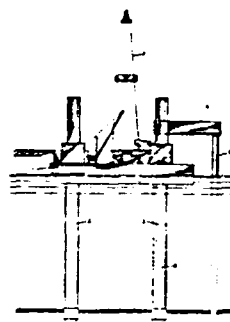


3,593,529
**METHOD AND APPARATUS FOR INSTALLING
 DRILLING PLATFORMS**
 August Hendrik Maria Smulders, Wassenaar, Netherlands,
 assignor to N. V. Industriele, Handelscombinatie, Nether-
 lands
 Filed Oct. 9, 1968, Ser. No. 766,274
 Claims priority, application Netherlands, Oct. 11, 1967, 67-
 13804
 Int. Cl. E02b 17/02, B63b 35/44
 U.S. Cl. 61-46.5 1 Claim

A buoyant mobile drilling platform has a gap in its side in which is detachably disposed a permanent drilling platform. The two platforms are floated to the drilling site and temporarily emplaced. If a test drill shows the presence of gas or oil, then the permanent platform is permanently emplaced and the mobile platform is floated away.

Keywords: Offshore construction; Offshore platform, fixed; Offshore platform, jack up

U.S. Cl. X.R. 114-43.5

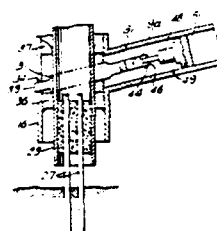


3,593,530
**MARINE PLATFORM WITH REMOVAL COLUMN
 CLAMPS**
 Ivo C. Pogonowski, Houston, Tex., assignor to Texaco Inc.,
 New York, N.Y.
 Filed July 22, 1969, Ser. No. 843,331
 Int. Cl. E02b 17/06
 U.S. Cl. 61-46.5 9 Claims

The invention relates to a marine platform adapted to be fixedly positioned in an offshore environment by anchoring to the ocean floor. The platform includes a work deck normally elevated above the water's surface, a foundation pedestal at the ocean floor, and one or more intermediary support columns which connect the deck to the pedestal. The columns are releasably held at their lower ends by remotely actuated clamping means. The elevated deck is thus supportably carried by the columns at an adjustable operating height.

Keywords: Offshore platform, jack up; Pile, structure connection; Seabed foundation

U.S. Cl. X.R. 24-243

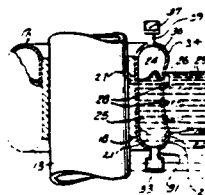


3,593,531
MARINE FENDER
 Fuad T. Saadeh, and Ivo C. Pogonowski, both of Houston,
 Tex., assignors to Texaco Inc., New York, N.Y.
 Filed June 27, 1969, Ser. No. 837,074
 Int. Cl. E02b 3/22
 U.S. Cl. 61-48 6 Claims

The invention relates to a fender for marine structures such as a support leg or column positioned to elevate a working platform above the water's surface. The fender is comprised of shock-absorbing members at least partially submerged to receive and absorb the impact of floating vessels, debris or the like. The fender includes cooperatively arranged hydraulic and pneumatic chambers, the hydraulic chamber being communicated with the body of water whereby to be maintained in a substantially full condition. The pneumatic chamber is separated from the hydraulic chamber by a yieldable diaphragm which is displaced into the air chamber as the fender is deformed in response to contact with a large floating body.

Keywords: Collision protection; Offshore structure fender

U.S. Cl. X.R. 114-219



3,593,532

CONCRETE PILE SECTIONS AND JOINTS THEREFOR
John Grazel, Santurce, P.R., assignor to John Grazel Inc., San Juan, P.R.

Filed Oct. 2, 1968, Ser. No. 764,384
Int. Cl. E02d 3/30

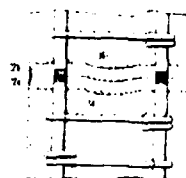
U.S. Cl. 61-56

3 Claims

Each cast concrete pile section has longitudinally extending reinforcing rods, the opposite ends of which are partially received within openings formed through normally disposed end plates. The rod ends extend intermediate the length of the openings and are welded to the end plates about the inside faces of the plates with weld also being applied externally within the openings from the outer faces of the plates. The edges of the end plates are beveled and the sectional piles are welded about the adjoining beveled edges in end to end relation. In one form, an end plate on one pile section is formed with a central concavity while the end plate on the adjoining pile section has a complementary central convex portion adapted to be received within the concavity as to align the piles in coaxial relation one to the other.

Keywords: Pile, concrete; Pile section connection

U.S. Cl. X.R. 29-155C; 29-160; 52-587



3,593,533

UNDERWATER COLLECTING AND LIFTING DEVICE
Lamar Washington, Natick, Mass., assignor to Ocean Recovery Corporation of America, Cambridge, Mass.

Filed Oct. 23, 1968, Ser. No. 769,843
Int. Cl. B63c 11/00; G01n 1/14; E02f 3/88

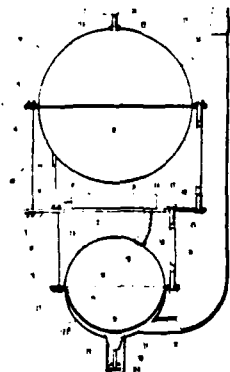
U.S. Cl. 61-69

7 Claims

An underwater collecting and lifting device for use in obtaining material from below the earth's surface, such as the floor of the ocean, has a first chamber for raising and lowering the device in a body of water and a second chamber for collecting the material and transporting it. A diaphragm divides the second chamber into two compartments and is movable so as to change the volumes of the two compartments inversely to each other.

Keywords: Instrument deployment; Sampler, seabed grab

U.S. Cl. X.R. 37-56; 73-425.6; 222-386.5



JULY 27, 1971

3,595,026
BREAKWATER

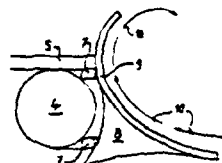
Richard Scholl, Hergiswil, Switzerland, assignor to Resa AG.,
Hergiswil, Switzerland
Filed Apr. 4, 1969, Ser. No. 813,480
Claims priority, application Switzerland, Apr. 5, 1968,
5204/68
Int. Cl. E02b 3/06

Keywords: Breakwater, floating

U.S. Cl. 61-5

7 Claims

There is disclosed a floating breakwater. Such breakwater may have elements arranged side by side with a lateral space between them such that part of the oncoming waves can pass in between. The elements may have a U-shaped horizontal cross section. They may have an arcuately curved vertical cross section so that each element can divert an oncoming wave upwardly and back upon itself.



3,595,189
WAVE-ACTUATED LOAD COMPENSATOR

William B. McLean, and Edgar N. Rosenberg, both of San Diego, Calif., assignors to The United States of America as represented by the Secretary of the Navy
Filed Feb. 2, 1970, Ser. No. 7,497
Int. Cl. B63b 35/00, 35/44

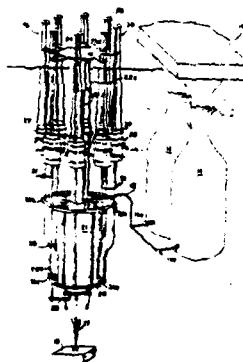
Keywords: Power, wave; Pump

U.S. Cl. X.R. 103-44; 114-183

U.S. Cl. 114-0.5

6 Claims

A wave-actuated floating load compensator having a chamber located substantially below the area of surface wave turbulence receives liquids, usually excess ballasting water or bilge water from a remotely disposed floating hull. A plurality of, preferably eight, reciprocally actuated pumping units is circumferentially disposed about the submerged chamber to ensure dynamic stability. A valve, provided on a chamber, meters the amount of fluid entering and the pumping units pump the fluid into the surrounding water. The valve and the pumping units thusly prevent inadvertent overloading of the compensator and its possible sinking. Having floats concentrically carried and guided on its associated pumping unit, eliminate costly seals and complicated linking mechanisms found in known devices.



3,595,196

FLOATING PLATFORM FOR VESSEL MOORING

Bruno Riffeser, Milan, Italy, assignor to S.T.O. Società Trasporti & Oleodotti S.p.A., Milan, Italy
Filed Feb. 12, 1969, Ser. No. 798,623
Claims priority, application Italy, Apr. 16, 1968, 15325A/68
Int. Cl. B63b 21/00, 21/52

Keywords: Offshore mooring structure; Offshore platform, fixed

U.S. Cl. X.R. 9-8

U.S. Cl. 114-230

3 Claims

Floating platform comprising a rigid structure driven into the sea bottom and projecting from the sea surface, and a floating platform freely rotatable and vertically movable with respect to the rigid structure, but restrained thereto in its transverse displacements. The floating platform is of an elongate shape in order to enable a vessel moored thereto to be disposed in accordance with the best strong side wind, the platform being also capable of varying its height relative to the sea surface, in which it can be completely immersed.



3,595,257
**VACUUM FILLING PROCESS AND SYSTEM FOR
 LIQUID-FILLED MARINE SEISMIC CABLES**
 Richard L. McMahon, Burbank, Calif., assignor to Schlumberger Technology Corporation, New York, N.Y.
 Filed July 22, 1969, Ser. No. 843,499
 Int. Cl. H01b 7/02

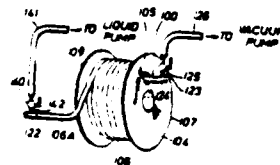
U.S. Cl. 137-1

3 Claims

A technique for completely filling a multicompartimented marine seismic cable with a compatible filling liquid such as kerosene, wherein the air in a hollow cable on a spool is evacuated with a vacuum pump from one end of the cable while the liquid is pumped into the cable through the opposite end until it is full. Improved evacuation and filling means are also provided which prevent loss of vacuum during the filling process.

Keywords: Seismic streamer cable

U.S. Cl. X.R. 137-205; 141-59; 174-25



3,595,324
**PILE DRIVERS INCLUDING MULTIPLE HAMMERS
 WITH COMMON ANVILS**
 Charles L. Guild, 90 Water St., East Providence, R.I., and
 Willard B. Goodman, 5 Larkspur Drive, Bellville, Ill.
 Filed Sept. 11, 1968, Ser. No. 759,172
 Int. Cl. E02d 7/00

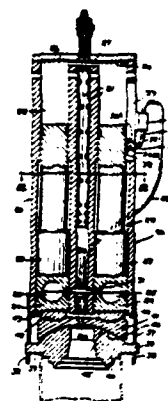
U.S. Cl. 173-101

27 Claims

Piledrivers, each including a plurality of hammers and common anvil means with aligning pads between the hammers and the anvil means and with means for phasing the operation of the hammers, with means for compensating for the effects of unphased hammer operations, and combinations thereof.

Keywords: Pile driver, impact

U.S. Cl. X.R. 173-131



3,596,070
WINCH CONTROL SYSTEM FOR CONSTANT LOAD
DEPTH

John M. McCool, Altadena; Shelby F. Sullivan, Arcadia;
Robert H. Hearn, Altadena, and Michael S. Ball, Pasadena,
all of, Calif., assignors to The United States of America as
represented by the Secretary of the Navy
Filed Dec. 8, 1969, Ser. No. 882,984
Int. Cl. G06g 7/78

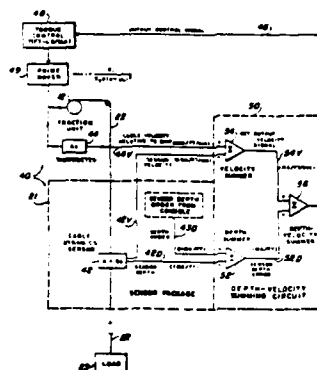
U.S. Cl. 235-151

7 Claims

A winch control system for operating a winch stationed on a vessel, and for stabilizing a load, which is connected by a cable to a traction unit driven by a prime mover, at a constant height above the sea floor irrespective of the vertical motion of the vessel due to wave action, thereby controlling the motion of the cable. A cable dynamics sensor, connectable to the cable between the traction unit and the load, generates output signals proportional (1) to its depth, and (2) to its velocity relative to the vessel. A tachometer, connectable to the traction unit, produces a signal which is proportional to the velocity of the cable relative to the vessel. A depth-velocity summing circuit, connected to the cable dynamics sensor, is adapted to be connected to a sensor depth order signal, generated by a control console on the vessel, for summing the sensor depth and depth order signals, and is connected to the cable dynamics sensor and tachometer for summing the sensor velocity signal and the cable velocity signal. The two depth and two velocity signals, after being summed, produce an output control signal. A torque control, adapted to be connected from the output of the depth-velocity summing circuit to the prime mover, develops a torque signal proportional to the control signal, to cause the traction unit to null the control signal, thereby controlling the load position and velocity.

Keywords: Tow winch control; Towed body depth control

U.S. Cl. X.R. 114-235B; 254-173R



AUGUST 3, 1971

3,596,512
EXPENDABLE AIR PROBE

Richard W. Bixby, Little Compton, R.I., assignor to The Sipican Corporation, Marion, Mass.
Filed Jan. 5, 1970, Ser. No. 641
Int. Cl. G01d 1/00

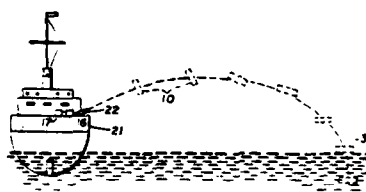
U.S. Cl. 73-170 A

5 Claims

A device for measuring the characteristics, such as temperature and humidity, of the air above a water surface comprises a probe which is launched in a trajectory over the body of water. The probe is connected to a measuring station by a conducting wire. The measuring probe is designed to have a low speed during descent, and may be in the form of a rotor, or be provided with a drag device such as a parachute to slow its descent.

Keywords: Bathythermograph; Instrument, airborne; Instrument deployment

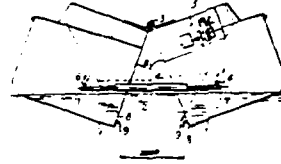
U.S. Cl. X.R. 244-3.24



3,596,621
LONGITUDINALLY SPLIT AND HINGED BARGE
 Kjell Werenskiold, Bekkestua near Oslo, Norway, assignor to
 Ingenior F. Selmer A/S, Oslo, Norway
 Filed Mar. 5, 1969, Ser. No. 804,502
 Int. Cl. B63b 35/30
 U.S. Cl. 114-29 3 Claims

Keywords: Hopper barge

This invention relates to an improvement in longitudinally split barges where the edges of the hopper of the barge with sealing means are pressed together on closing the barge. Said sealing means consisting of at least one projecting web on one barge half and at least two projecting webs on the second barge half (i.e. the edges of the hopper), the said webs interacting and thus form a labyrinth seal and a shearing force resistant element between the two barge halves.



AUGUST 10, 1971

3,597,778
MOORING DEVICES
 Hans Castelliz, Halifax, Nova Scotia, Canada, assignor to E M
 I Limited, Hayes, England
 Filed Sept. 20, 1967, Ser. No. 654,892
 Claims priority, application Great Britain, Aug. 19, 1966,
 37,147/66
 Int. Cl. B63b 21/52
 U.S. Cl. 9-8 10 Claims

Keywords: Buoy mooring system; Instrument deployment

The invention relates to a mooring device which includes a float intended for mooring below the surface of the sea, a sinker, a cable connecting the float to the sinker and means for paying out the cable. The device also includes control means for regulating the pay out of the cable in response to the ambient pressure at the float so as to tend to maintain the float at a predetermined depth below the surface during the mooring process, and in addition locking means operative to lock the paying out means when paying out ceases.



3,597,924
FLOATING OIL BARRIER AND METHOD OF CONTAINING A FLOATING SUBSTANCE
 Murray Risin, Palm Beach Gardens, and Robert M. Snyder, Jupiter, both of, Fla., assignors to Ocean Science and Engineering, Inc., Washington, D.C.
 Filed Feb. 7, 1969, Ser. No. 797,523
 Int. Cl. L02b 15/04
 U.S. Cl. 61-1 14 Claims

Keywords: Pollutant, surface barrier

U.S. Cl. X.R. 61-5

A system for circumscribing and impounding oils floating on the surface of water which includes a water-impervious, floating enclosing barrier presenting a substantially rigid vertical surface to the oil with means permitting limited movement of the barrier in the horizontal and vertical planes to compensate for constantly changing wave shapes and forms.



3,597,928
EROSION CONTROL

Jan Carel Pilaar, Boslaan 3, Warnsveld, Netherlands
Continuation-in-part of application Ser. No. 564,167, July 11, 1966, now Patent No. 3,421,417. This application Sept. 12, 1968, Ser. No. 759,263

Claims priority, application Netherlands, Dec. 22, 1967, Jan. 3, 1968, Jan. 23, 1969, Mar. 20, 1968, 6717542, 6800032, 6800961, 6803917
Int. Cl. E02b 3/14

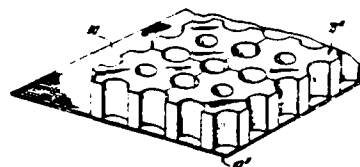
U.S. Cl. 61-38

26 Claims

The invention relates to an erosion-controlling protective surfacing for the soil comprising flexible liquid-permeable supporting sheet means conforming to the contour of the soil and a mat of blocks on said supporting sheet means, said mat having drainage passageways therethrough so that water can pass through the surfacing. Preferably, the surfacing includes filter means and the blocks are secured to the supporting sheet means.

Keywords: Concrete block; Fabric mat; Low-cost shore protection; Revetment; Slope protection

U.S. Cl. X.R. 61-4



3,597,930
METHOD AND APPARATUS FOR REINFORCING IN
SITU IN PILE CASING

William R. Rochelle, Houston, Tex., and Ronald Lee Wycoff, Rolla, Mo., assignors to Brown & Root, Inc., Houston, Tex.
Filed Apr. 4, 1969, Ser. No. 813,479

Int. Cl. E02b 17/00; E02d 5/64

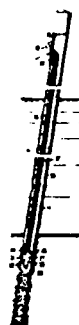
U.S. Cl. 61-46

9 Claims

A method of reinforcing, in situ, a piling comprising the steps of: gaining access into the pile casing, cleaning mud and debris from the interior of the casing and simultaneously removing the debris, inserting stiffening or reinforcing material into the casing and sealing the pile casing access opening. The step of simultaneously cleaning and removing is essentially performed by a pile cleanout device comprising a fluid jetting portion operable to dislodge and fragment sediment and other debris within the jacket pile casing, and a gas lift portion integral therewith to remove the fragmented matter from the interior of the pile casing.

Keywords: Offshore construction; Offshore platform, leg; Pile, concrete; Pile, steel; Structure repair

U.S. Cl. X.R. 61-53.52; 61-54



3,597,931
ANCHORAGE SYSTEM AND METHOD OF USE

Carl G. Hard, 14 Spring Lane, Framingham, Mass.
Filed Oct. 9, 1969, Ser. No. 865,103

Int. Cl. B63b 21/00

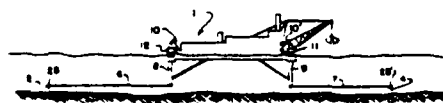
U.S. Cl. 61-46.5

7 Claims

The invention relates to marine anchorage systems and their use. The anchorage system is a mooring spud having a detachable shoe that is fastened to a mooring cable leading from the spud shoe to a winch, having an adjustable drag, on board the vessel. By means of drawing in and paying out the mooring cable the vessel may be moved in an accurately traced path so as to cover a marine floor in a manner consistent with precision dredging operations. A modification includes a shoe provided with a vibrator to effect deeper penetration of the shoe into the marine floor.

Keywords: Dredge propulsion; Embedment anchor

U.S. Cl. X.R. 37-73; 61-53; 114-206



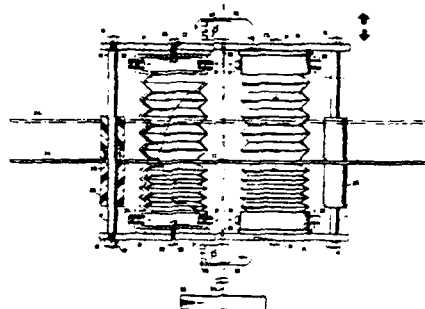
3,598,505
BELLWS PUMP

Michael L. Greene, Hillcrest Heights, Md., and Joseph R. Jadamec, Woodbridge, Va., assignors to The United States of America as represented by the Secretary of the Navy
Filed Oct. 24, 1969, Ser. No. 869,127
Int. Cl. F04b 17/00, 35/00, 43/00
U.S. Cl. 417-330 5 Claims

This invention relates to a bellows-type pump connected to a cable and lowered into surrounding waters for operation as the cable is moved up and down due to wave action or mechanically. A plate secured relative to the bellows is constrained against movement by the water thereby compressing and releasing the bellows from compression to provide pumping action.

Keywords: Power, wave; Pump; Sampler, water

U.S. Cl. X.R. 417-330; 417-473



3,598,729
METHOD OF REMOVING OIL SLICKS FROM
WATER SURFACES

Heinz Baumann, 3 Zuckerfabrikstrasse,
Frankenthal, Pfalz, Germany

No Drawing. Continuation-in-part of application Ser. No. 678,214, Oct. 26, 1967. This application Nov. 13, 1969, Ser. No. 876,579

Claims priority, application Germany, Oct. 28, 1966,

C 40,551

Int. Cl. B01d 15/00

U.S. Cl. 210-40

4 Claims

When a piece of fully cured urea formaldehyde resin foam is dipped into an oil slick floating on water, only the oil slick is absorbed into the piece of foam. Entry of the water is blocked by the narrow capillaries in the cell walls which connect most of the otherwise sealed air cells in the foam to each other and to the atmosphere. They permit absorption of liquids of low surface tension, but not of liquids having a surface tension as high as that of ordinary water or of sea water which essentially consists of water. Urea formaldehyde resin is much less costly than the corresponding resins prepared from melamine and phenol whose foams have a similar structure and are similarly effective.

Keywords: Pollutant absorption

U.S. Cl. X.R. 210-DIG 21

No Figure

3,599,090

**APPARATUS FOR DETECTING AND MEASURING
CREVICE CORROSION**

Vincent F. Fitzpatrick; Russell B. Richman, and James R. Divine, all of Richland, Wash., assignors to The United States of America as represented by the Secretary of the Interior

Filed June 30, 1969, Ser. No. 837,816

Int. Cl. G01n 27/00

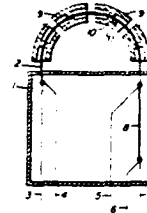
U.S. Cl. 324-71 C

7 Claims

Crevice corrosion may be detected and measured by use of a probe device which discriminates between crevice corrosion and other corrosion phenomena. A metallic test specimen is structurally associated with an electrically non-conductive member to form an extended crevice region of predetermined width between the test specimen and the non-conductive member. Crevice corrosion, after exposure of the probe to a corrosive environment, is determined by measuring the electrical resistance of the test specimen relative to a shielded reference electrode.

Keywords: Corrosion measurement

U.S. Cl. X.R. 23-253C; 204-195; 324-65CR; 338-13



AUGUST 17, 1971

3,599,354

**APPARATUS FOR REMOVING WEEDS FROM SOIL
UNDER WATER**

Winston C. Larson, 1117 Minnesota Ave., Detroit Lakes, Minn.

Filed Oct. 18, 1968, Ser. No. 768,866

Int. Cl. E02f 5/28

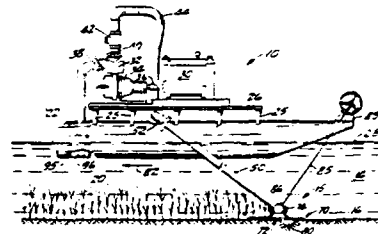
U.S. Cl. 37-78

1 Claim

An apparatus for removing weed growth from soil under water through the use of hydrojet action. The apparatus employs a jet tube assembly with spaced jets along the extent of the same which provides a sweeping action to remove soil from around the roots of weeds for the purpose of removing weeds from the bottom. It employs a floatable platform to which the jet assembly is attached with the jet assembly being pivoted on the platform which mounts a motor-driven jet assembly being pivoted on the platform and forcing it through the jet assembly under high pressures. The jet assembly is adjustable relative to the soil surface to insure proper cleaning operation.

Keywords: Water plant removal

U.S. Cl. X.R. 56-8



3,599,383

PILE-AND-CONCRETE CONNECTOR

Robert Fred Moore, 1625 Third Ave., Picayune, Miss., and Alvin Edward Moore, 916 Beach Blvd., Waveland, Miss.

Filed July 22, 1969, Ser. No. 843,516

Int. Cl. E04b 1/41, 1/30, 5/16

U.S. Cl. 52-250

15 Claims

A device anchoring a concrete slab to the top of a wooden or concrete pile, preventing the concrete, when subjected to uplift, from tearing away from the pile. A notch on each side of the pile has a surface inclined upward and outward from the pile's axis and supporting concrete-anchoring means. This inclined surface resists uplifting force on the slab. One type of anchoring device comprises a rod extending thru the pile, inclined to a plane containing its axis, and ending above it in a concrete-anchoring hook. Another type comprises an angle iron, fixed in the notch, and extending laterally beyond the sides of the pile. To this angle a hooked concrete-anchoring rod (or pair of rods) optionally may be fixed.

Keywords: Pile, concrete; Pile, structure connection; Pile, wood

U.S. Cl. X.R. 52-263; 52-281; 52-301; 52-712



3,599,434
**DEVICE FOR CONFINING OIL RELEASED BY
 LEAKAGE DURING OFFSHORE OIL DRILLING
 OPERATIONS**

Louis Missud, 61-15 43rd Ave., Woodside, L.I., N.Y.
 Filed June 3, 1969, Ser. No. 829,865
 Int. Cl. E02b 17/00, 15/04

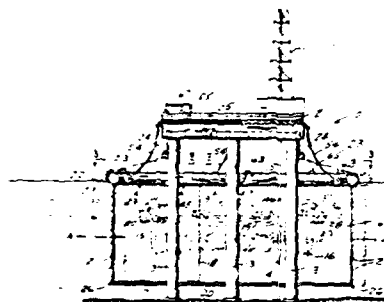
U.S. Cl. 61-46

9 Claims

Keywords: Pollutant, surface barrier

U.S. Cl. X.R. 61-1; 61-5

A floatable tube and skirt assembly encircling an offshore oil drilling rig for collecting oil released by leakage during the drilling operation, and movable between an operative oil-confining position and an inoperative position in noninterfering relation to the drilling shaft. The tube is connected to the rig structure by telescopically extensible arms, there being (in one embodiment) a plurality of floatable lift canisters connected to said arms and tube, each canister having perforated walls and an inner inflatable bag, an air pump on the rig being connected to said canisters and said tube. When all the canister bags and the tube are deflated, they will sink to an inoperative position, pivotally guided inwardly to that position by said telescopic arms, said arms also serving to guide the tube into its operative floating position. A drawstring arrangement contracts the skirt into compact form against the tube, in noninterfering relation to the drilling shaft.



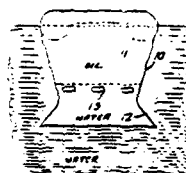
3,599,590
FLOATING OIL-RECOVERY SUMP
 Jose Dominguez Rego, 600 Broad St., Newark, N.J.
 Filed June 10, 1969, Ser. No. 831,959
 Int. Cl. B63b 35/00

U.S. Cl. 114-0.5

3 Claims

Keywords: Offshore storage tank, emergent;
 Pollutant, submerged barrier;
 Pollutant, surface barrier

A floating vessel comprising a hull having an upper end lying above the surface of a body of water and an open lower end lying below the water surface to admit and accumulate upward flowing oil or gas from an underwater well.



AUGUST 24, 1971

3,600,832
PIVOTED CUTTER AND CONTROL FOR HYDRAULIC
DREDGE

Thomas J. Smith, deceased, late of Stratford, Conn. (by James E. Smith, administrator, 1500 Elm St., Stratford, Conn., 06497)

Filed Jan. 20, 1970, Ser. No. 4,334
Int. Cl. E02f 3/92

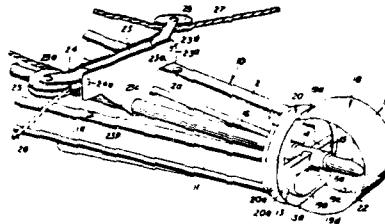
U.S. Cl. 37-58

12 Claims

On the outboard end of a hydraulic dredge ladder there is an axially extending stub shaft mounted in spaced-apart bearings. Attached to the outer end of the ladder is a circular bearing member that extends transversely to and coaxial about the stub shaft. A cutter member formed of heavy sheet metal material in a circular arc a little greater than a semicircle is welded at its ends to a circular channel iron ring that is received over the circular bearing member for pivotal movement thereon. The inner midportion of the semicircularlike cutter head has a bearing member affixed thereto that is received over the protruding end of the stub shaft. A triangularlike bracket is received over the stub shaft towards its rear end and is welded thereto. The base of the triangularlike bracket is up and above the stub shaft and has a pivotal mounting at each end that carries a sheave. Below each end of the bracket there is a cutaway portion that forms stop portions which strike against stops on the side I-beams of the boom positioned therebelow to limit the tilt of the shaft and the cutter. The usual hauling wire ropes lead from a hauling drum through their respective sheaves to respective anchor position out beyond the side of the boom. By slackening on one rope and hauling on the other with the cutter in the earth, its edges cut into the earth and it tilts so as to loosen the earth that is then sucked up by the mouth of the suction tube.

Keywords: Dredge, cutterhead; Dredge intake; Dredge ladder control

U.S. Cl. X.R. 37-71



3,600,896
MARINE FENDER ASSEMBLY
Tamotsu Tateisi; Akihisa Mori; Takeo Takagi; Masanori Ogino, and Keinosuke Hara, all of Yokohama, Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan

Filed Oct. 27, 1969, Ser. No. 869,514
Claims priority, application Japan, Oct. 29, 1968, 78,323/68
Int. Cl. E02b 3/22

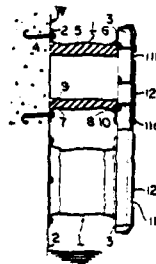
U.S. Cl. 61-48

9 Claims

A marine fender assembly for protecting a wall from impact, including a frontal plate spaced from the wall and one or more fender bodies disposed between the frontal plate and the wall. The fender body is made of elastomer and comprises a hollow cylindrical portion and a pair of flanges which are integrally formed with the cylindrical portion at opposite ends thereof. One of the flanges of the fender body is secured to the wall in such manner that the axis of the fender body extends at right angles to the wall. The frontal plate is secured to the other one of the flanges of the fender body.

Keywords: Pier fender

U.S. Cl. X.R. 114-219; 267-140



3,601,052

UNDERWATER CHARGE LAUNCHER

John C. Mollere, San Marino, Calif., assignor to Western Geophysical Company of America, Houston, Tex.
Filed June 12, 1969, Ser. No. 832,727

Int. Cl. F42d 3/06

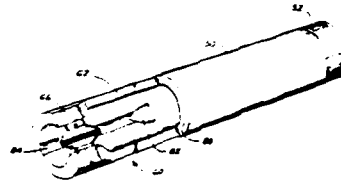
U.S. Cl. 102-22

4 Claims

This invention relates to an underwater charge launcher for consecutively firing percussion-initiated, explosively operated charges under a body of water to generate therein seismic waves useful in seismic prospecting operations. The launcher includes a casing adapted to receive water-propelled charges and a percussion member which while arresting the motion of the charge also percussion initiates the blasting cap of the charge. A lateral window for ejecting the percussion-initiated charges from the casing, and at least one cavity in the casing opposite the window to develop a relatively high-pressure zone for facilitating the ejection of the charge through the window.

Keywords: Seismic explosive acoustic transmitter

U.S. Cl. X.R. 181-.5X



3,601,217

AIR-OPERATED SEISMIC GAS EXPLODERS

Ben B. Thigpen, and Carl H. Savit, both of Houston, Tex., assignors to Western Geophysical Company of America, Houston, Tex.

Filed May 16, 1969, Ser. No. 825,377

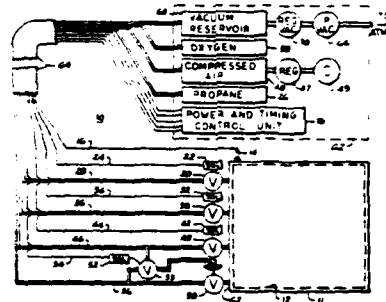
Int. Cl. G10k 1/100

U.S. Cl. 181-.5

7 Claims

This invention relates to marine seismic gas exploders and to methods for operating them. A seismic gas exploder typically includes a housing having an expansible combustion chamber to which is periodically supplied a charge of a combustible gas mixture. The charge is detonated and the spent gases are preferably exhausted by a vacuum-operated exhaust system. The combustible gas mixture in accordance with this invention generally includes oxygen, a fuel gas, and an inert gas or preferably a fuel gas, oxygen and air. The partial air pressure is selected to allow the oxygen to completely burn the fuel gas and the nitrogen portion of the air is selected to obtain a pre-firing pressure equal to or less than the ambient pressure of the water.

Keywords: Seismic explosive acoustic transmitter



AUGUST 31, 1971

3,601,999

METHODS OF GROUTING OFFSHORE STRUCTURES

Horace W. Olsen, 2038 North Blvd., Houston, Tex., and Max Bassett, P.O. Box 808 South, South Houston, Tex.

Filed Sept. 18, 1969, Ser. No. 858,951

Int. Cl. E02b 17/00; E02d 5/24

U.S. Cl. 61-46

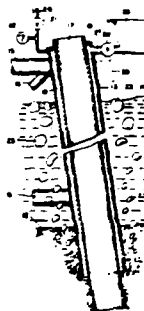
1 Claim

Keywords: Grouting; Offshore construction; Pile, structure connection

U.S. Cl. X.R. 61-54

See: Re. 28,232

Compressed air is introduced into an annular space existing between the jacket and piling in the legs of an offshore structure, so that water is expelled from the annular space through the lower end of the jacket and grouting material is then introduced into the annular space. The introduction of compressed air and grouting material is effected from above the waterline, thus avoiding the necessity of performing the grouting operation by divers at the sea bed.



3,602,000

REINFORCED STEEL PIPE PILING STRUCTURE

Homsyoun Joe Meheen, Box 515, Rte. 3, Golden, Colo.

Continuation-in-part of application Ser. No. 712,187, Mar.

11, 1968, now Patent No. 3,403,707, dated July 16, 1969.

This application Sept. 19, 1969, Ser. No. 859,403

Int. Cl. E02d 5/40, 5/58; E04c 3/34

U.S. Cl. 61-46

10 Claims

Keywords: Offshore construction; Offshore platform, leg; Pile, concrete; Pile, steel; Structure repair

U.S. Cl. X.R. 52-223; 61-53; 61-53.52; 61-56

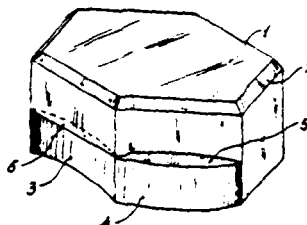
Reinforcement for steel pipe piles and piling structure such as that supporting an offshore oil platform, which has deteriorated and lost its strength. The pile is reinforced in situ by cutting an access opening into its interior, or cutting such an access opening through the pile to communicate with the interior of a steel bracing pipe in the structure, and introducing a partially prestressed and partially reinforced concrete column inside the steel shell.



3,602,111
PAVING BLOCKS
 Fermin Laguardia Clemente, Pablo Garnica, 8, Torrelavega,
 Santander, Spain
 Filed June 9, 1969, Ser. No. 831,581
 Int. Cl. E01c 5/00
 U.S. Cl. 94—13 2 Claims

Paving blocks for the formation of paving by which it is avoided cracks produced by flexing, or expansion and contraction on continuous pavings or large paving flags, and repair and replacement is readily and easily done. These blocks are prefabricated in concrete, ceramic, plastic or other materials, upper part of which presents a prismatic shape with a regular polygonal section, preferably hexagonal, and with the lower part provided with curved surface depressions and protrusions that determine and allow at the same time for their linkage and articulation.

Keywords: Concrete block; Low-cost shore protection; Revetment

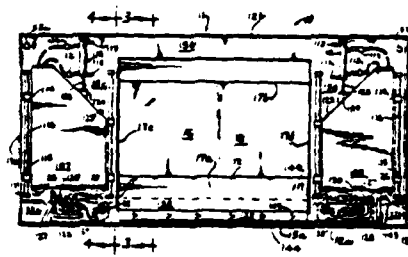


3,602,182
TUMBLE BARGE
 Albert B. Cady, Jr., Houston, Tex., and Thomas R. Hency,
 Jr., 2707 57th St., Galveston, Tex.
 Division of Ser. No. 709,408, Feb. 29, 1968, Pat. No. 3,473,501
 Filed Aug. 20, 1969, Ser. No. 864,249
 Int. Cl. B63b 13/02; 35/30
 U.S. Cl. 114—198 3 Claims

The tumble barge takes load and is towed, unmanned, to dump site. Ballast tanks on bow and stern also serve as compressed air reservoirs to supply operational air, upon actuation of barge apparatus, as by remote control, to open flood valves on one side (port) and to open scupper valves on such side. Vessel normal metacenter and floodable space relationship is such that list increases with flooding until vessel capsizes almost 180° completely to dump hold contents. The ballast arrangement is designed to build up a righting moment in clock direction counter to clock direction of capsizing, thus to right the barge. Apparatus may be actuated by remote control to admit compressed air to open and close flood valves and scupper valves.

Keywords: Hopper barge

U.S. Cl. X.R. 114—38

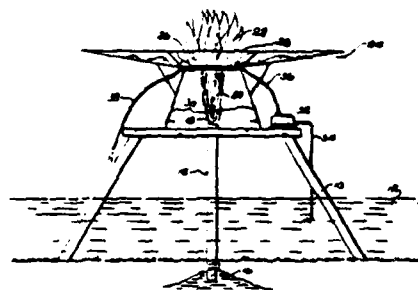


3,602,299
OIL OR GAS POLLUTION CONTROL APPARATUS AND METHOD
 Joseph D. Mozic, 7311 Vista Del Mar, Playa Del Rey, Calif.
 Filed May 12, 1970, Ser. No. 36,573
 Int. Cl. A62c 3/00; E21b 7/12; 35/00
 U.S. Cl. 166—5 20 Claims

A method which is particularly suitable to prevent oil pollution of water in the vicinity of an offshore drilling operation. Apparatus is provided for use on a ruptured oil and/or natural gas pipe where fluid is issuing under pressure from the pipe. A heat dissipating screen is disposed in the path of the fluid and raised to a predetermined position. The fluid is then intentionally ignited (thus preventing pollution), the heat dissipating effect of the screen confining the flame to a region above the screen, spaced from the open end of the well pipe. A thermal radiation shield can be provided as well as water coolant members for the screen and shield.

Keywords: Pollutant burning; Pollutant collection

U.S. Cl. X.R. 165—47; 431—2; 431—328



3,602,320
DEEP SEA PILE SETTING AND CORING VESSEL
 George C. Howard, Tulsa, Okla., assignor to Amoco Production Company, Tulsa, Okla.
 Filed Oct. 16, 1968, Ser. No. 767,954
 Int. Cl. E21b 15/02

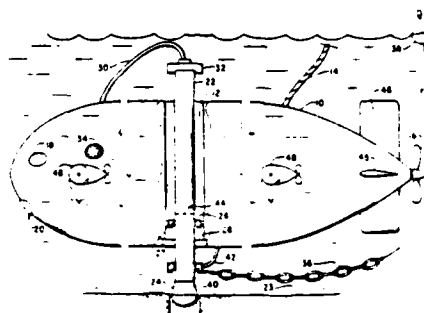
U.S. Cl. 175-8

11 Claims

This invention relates to an underwater, manned vessel useful for drilling in piles, setting anchors and taking samples of the bottom of a body of water. A conventional submarine vessel is modified to have a vertical passage therethrough. The passage contains a rotary table for rotating an anchor pile which extends through the vertical opening. Means are provided to circulate sea water down through the pile during drilling-in operations. Means are also provided to obtain cores from the sea bottom.

Keywords: Embedment anchor; Sampler, seabed-drilled core

U.S. Cl. X.R. 175-58



3,602,878
METHOD AND APPARATUS FOR GENERATING ENHANCED ACOUSTIC WAVES
 Lawrence B. Sullivan, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.
 Filed Apr. 14, 1969, Ser. No. 815,930
 Int. Cl. G01v 1/00

U.S. Cl. 340-7 R

6 Claims

A plurality of air guns are streamed along a marine traverse, certain of the air guns having different volume capacities to generate acoustic waves having different frequency contents and pressure wave characteristics. Circuitry is provided to sequentially fire the air guns such that the first high energy oscillations of all the acoustic waves occur at the same time, thereby providing a resultant acoustic signal having an enhanced high energy oscillation.

Keywords: Seismic acoustic transmitter array; Seismic explosive acoustic transmitter; Seismic survey method



SEPTEMBER 7, 1971

3,602,925

FLOATING SWIMMING POOL

Kenneth L. Thompson, Huntington Beach, Calif., assignor to
Ye Dock Master, Inc.

Filed Aug. 25, 1969, Ser. No. 852,586

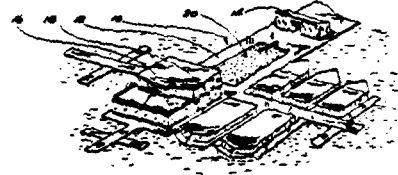
Int. Cl. A47k 3/00; E04b 3/16, 3/18

U.S. Cl. 4-171

11 Claims

A floating swimming pool for use in a wharf structure. An expanse of decking is supported over a body of water and defines an enclosed opening through which the swimming pool depends into the body of water. The swimming pool includes a basin having a rigid bottom portion and a flexible wall portion between the bottom portion and the decking. A water channel extends along the perimeter of the swimming pool and opens into the pool to define the waterline thereof.

Keywords: Pier, floating; Small-craft pier



3,603,009

**SUCTION DREDGE HAVING ENDLESS DIGGER
ALIGNED WITH SUCTION PIPE**

Pieter Theodor Velleboom, Monster, Netherlands, assignor to
N. V. Industriële Handelscombinatie, Holland, Rotterdam,
Netherlands

Filed Mar. 13, 1969, Ser. No. 806,587

Int. Cl. E02f 3/92, 3/14

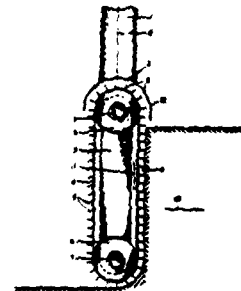
U.S. Cl. 37-60

7 Claims

A digging suction dredge has a suction tube and an endless conveyor-type digging device whose frame is rigid with the intake end of the suction tube along a line which is parallel to the centerline of the intake end of the suction tube. The endless member has digging paddles thereon that fan out about end rollers to discharge material to the suction tube.

Keywords: Dredge, cutterhead; Dredge intake

U.S. Cl. X.R. 37-69



3,603,276

FLOTATION DOCKING FACILITY FOR SMALL CRAFT
Gaston A. De Lisle, Encino, Calif., assignor to Gaston A. De Lisle, as trustee under a Declaration of Trust dated March 5, 1970

Filed July 18, 1969, Ser. No. 843,078
Int. Cl. B63c 1/02; B63b 35/00

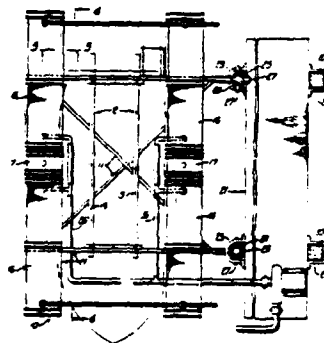
U.S. Cl. 114-45

15 Claims

A flotation docking facility for marinetraft slidable vertically of suitable bracket means with rise and fall of the tide and including pontoon-supported cradle means for lifting small craft clear of the water when the craft is not in use. The facility includes adjustable buoyancy means compensating for the weight of the docking facility and effective to support the latter submerged at a level intermediate the seabed and the underside of the hull.

Keywords: Small-craft mooring device;
Small-craft service structure

U.S. Cl. X.R. 114-0.5



3,603,426

APPARATUS FOR MARINE SEISMOGRAPHIC PROSPECTING
William Neilson, Stevenston, Scotland, assignor to Imperial Chemical Industries Limited, London, England
Continuation of application Ser. No. 775,028, Nov. 12, 1968, now abandoned. This application Feb. 24, 1970, Ser. No. 14,747

Int. Cl. G01v 1/04, 1/38

U.S. Cl. 181-0.5 VM

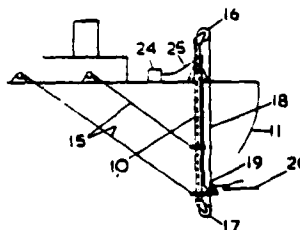
13 Claims

Apparatus for marine seismographic prospecting consists of a boom and a movable charge carrier attached to the boom.

Using this apparatus an explosive charge may be submerged and towed at a constant, predetermined depth behind the ship.

Keywords: Seismic explosive acoustic transmitter; Towed body depth control

U.S. Cl. X.R. 181-0.5 XC



3,603,804

WAVE OPERATED POWER APPARATUS

Jesse Marion Casey, Scottsboro, Ala., assignor to Dr. A. Carl Collins and Dawson, McGinty and Livingston, Scottsboro, Ala., part interest to each

Filed Feb. 16, 1970, Ser. No. 11,522

Int. Cl. F03b 13/12

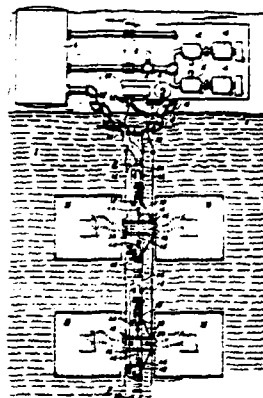
U.S. Cl. 290-42

7 Claims

An elongated U-shaped pipeline has floats pivoted on transverse axes for rocking thereon in response to wave action in water which the floats are buoyant. Rocking of the floats operates pumps arranged in pressure compounding relation and the fluid under pressure is delivered to a shore-based storage tank. The storage tank being sealed allows build up of a pressure head. The fluid is let out through a regulator to operate machinery. Spent fluid from the plant is spilled out into a recovery tank, directly under the motor or turbine. It is then picked up by the lower leg of the pipeline and returned to repeat its cycle again. The floats support the pipeline and can be flooded to sink below the surface to avoid damage by storm waves.

Keywords: Electrical generator; Power, wave; Pump

U.S. Cl. X.R. 290-53; 417-61; 417-332; 417-521



3,603,952

SPILL SENSORS

Millard F. Smith, P.O. Box 295 Saugatuck, Westport, Conn.

Filed May 12, 1969, Ser. No. 823,587

Int. Cl. H04b 1/02; G01l 1/16; G08b 21/00

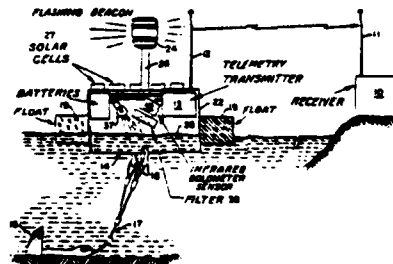
U.S. Cl. 340-224

9 Claims

Sensing methods and apparatus for monitoring the surface condition of a body of water including floating sensor units deployed on the water surface employing reflected infrared radiation detectors to sense the presence of floating hydrocarbons from an oil spill or floating industrial waste, sewage or the like. Telemetry signals report the surface condition of the body of water to a central receiver unit.

Keywords: Pollutant measurement

U.S. Cl. X.R. 9-8; 250-83.3; 325-116; 340-236



SEPTEMBER 14, 1971

3,604,258

UNIFORM DESCENT-RATE PROBE

Karl Maershofer, Scottsdale, Ariz., assignor to Motorola,

Inc., Franklin Park, Ill.

Filed Oct. 21, 1969, Ser. No. 868,063

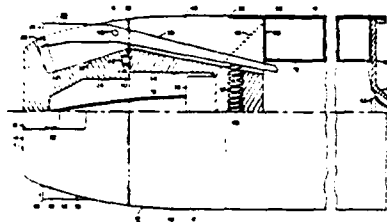
Int. Cl. G01d 1/00

U.S. Cl. 73-170 A

9 Claims

As a probe descends into the water under the influence of gravity, a wire is paid out to carry to a signal indicator information concerning the properties of the water, such as the temperature thereof, at various depths of the water. Means are provided to keep the rate of descent of the probe constant even though the paying out of the wire lessens the weight of the probe. These means may take the form of variably positionable spoiler vanes that add less and less amounts of resistance of the water to the descent of the probe therethrough as the probe becomes lighter, or means to cause more water to flow through the probe as the weight of the probe becomes less.

Keywords: Instrument deployment



3,604,387

MEANS FOR LAUNCHING, TOWING AND RECOVERING
AN OCEANOGRAPHIC TOWED BODY IN A SEAWAY

Neville E. Hale, Port Credit, Ontario, and Kenneth Gardner,

Mimico, Ontario, both of, Canada, assignors to Fathom

Oceanology Limited, Port Credit, Ontario, Canada

Filed Aug. 4, 1969, Ser. No. 847,129

Claims priority, application Great Britain, Sept. 3, 1968,

41748/68

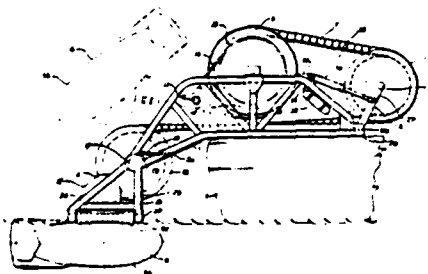
Int. Cl. B63b 21/00

U.S. Cl. 114-235 R

8 Claims.

A cable wound around a winch on a vessel has an acoustic towed body attached to the free end of the cable which also passes over a sheave mounted outward of the vessel; a saddle assembly is pivoted on the sheave, the assembly supporting the acoustic body and lifting it out of the water for storage; inward of the winch is a cable-tensioning device which consists of another sheave carried on a pivotable arm which is moved towards and away from the winch by a piston and cylinder connected to an accumulator which maintains constant pressure on the arm and thereby moves it in response to the increase and decrease in the tension of the cable when the acoustic body is towed.

Keywords: Instrument deployment; Instrument retrieval; Tow winch control



3,604,519
**METHOD OF CREATING UNDERWATER THRUSTS TO
 DRIVE A MEMBER INTO THE EARTH**
 Stephen V. Chelminski, Valley Rd., RFD 1, West Redding,
 Conn.

Filed Feb. 14, 1969, Ser. No. 799,449
 Int. Cl. E02d 7/06

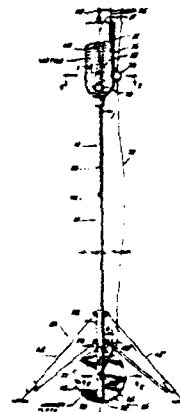
U.S. Cl. 173—1

3 Claims

A novel thruster method and apparatus generating a sequence of powerful thrusts suitable for driving an anchor, a pile, or the like into the earth. A novel anchor, anchor placing apparatus and pile driver are described. An acoustic impulse repeater device is located within a reaction barrel to rapidly upwardly impel water therefrom. In the case of the anchor placing apparatus, the reaction of the barrel rams an anchor and the anchor chain attached to it into sediment below a body of water. In the pile driver embodiment, the pile has taken the shape of the reaction barrel into which water is placed. Various embodiments are described.

Keywords: Embedment anchor; Offshore construction; Pile driver, impact

U.S. Cl. X.R. 114-206; 175-6



3,604,522
PILE-DRIVING SYSTEM AND APPARATUS
 Samuel Clifford Doughty, Burlingame, Calif., assignor to
 Santa Fe International Corporation, Santa Fe Springs,
 Calif.

Filed Aug. 30, 1968, Ser. No. 756,685
 Int. Cl. E02d 7/00

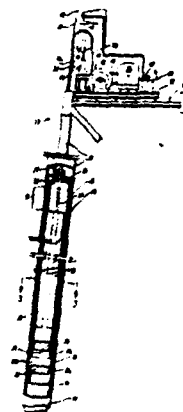
U.S. Cl. 173—88

3 Claims

A system for driving piles by a succession of blows struck from above by a hammer element wherein a driving head assembly transfers the blow to the upper end of a hollow elongated pile. The driving head comprises an anvil element to engage the upper end of a pile and includes an elongated hollow case extension portion containing the reciprocable hammer element. A cable connected to the hammer element extends upwardly to an outdoor work platform for hoisting and lowering the driving head assembly. A pulley driven by hydraulic actuator means provides reciprocating movement to the hammer element.

Keywords: Offshore construction; Pile driver, impact; Pile placement

U.S. Cl. X.R. 173-128; 175-171



SEPTEMBER 20, 1971

3,605,296

AMPHIBIOUS DITCH EXCAVATOR

Ronald R. Dysart, Oakland, Calif., assignor to Wetland

Engineering Co., Oakland, Calif.

Filed Sept. 20, 1968, Ser. No. 761,271

Int. Cl. E02f 3/88, 5/08

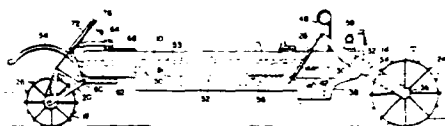
U.S. Cl. 37-61

2 Claims

An amphibious vehicle for cutting material from the bottom of a water-filled ditch by means of a revolving cylindrical drum which is studded with projecting cutting elements. The drum, which is journaled to the front of a watertight body member, can be lowered into contact with the bottom of a water-filled ditch when the body member is floating in the ditch. The slurry produced by the rotary cutting action of the drum is drawn into an opening in the bottom of the body member by suction and is pumped out a T-shaped conduit which extends transversely beyond both sides of the body member. The suction at the bottom of the conduit is produced by a jet-pump system in which a stream of water is pumped into the conduit through a jet nozzle near the opening in the bottom of the body member. This stream of water flows through a venturi constriction in the conduit, draws the slurry into the conduit opening, and propels it through the T-shaped conduit for discharge beyond the edges of the ditch. A second cylindrical drum is journaled to supporting arms which project from the rear of the body member. This drum is studded with projecting traction elements and can be lowered into contact with the bottom of the ditch and rotated to propel the body member along the ditch. The rear drum can also be turned from side to side for steering purposes, and the entire vehicle can be driven over land, marsh, or paved roads to reach its destination.

Keywords: Dredge, cutterhead; Dredge propulsion; Water plant removal

U.S. Cl. X.R. 37-66; 37-70; 37-95; 115-1



3,605,414

SUBMERGED WELL HEAD PLATFORM

Joseph W. Westmoreland, Jr., Houston, Tex.

(% Texaco, Inc., P.O. Box 430, Bellaire, Tex. 77401)

Filed Nov. 27, 1968, Ser. No. 779,412

Int. Cl. E02d 27/52; E21b 15/02

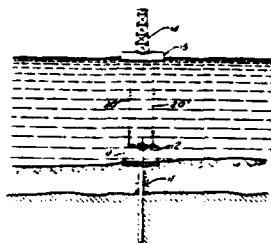
U.S. Cl. 61-46

4 Claims

The invention relates to an offshore platform adapted to be submerged and positioned on the floor of a body of water whereby to support an under water well head or similar equipment a predetermined distance above the floor. The platform is particularly adapted for use in a substratum characterized by an unconsolidated or muddy composition which would ordinarily be inadequate to stably support the well head as well as drilling casing and the like. A primary support factor is contributed by a foundation pad connected to, and depending from the conductor pipe, which pad is supported at the ocean floor thereby establishing a firm housing for the conductor pipe.

Keywords: Seabed foundation; Seabed oil, process structure

U.S. Cl. X.R. 61-69; 166-.5



3,605,674
UNDERWATER CABLE CONTROLLER
 Raymond C. Weese, Houston, Tex., assignor to
 Dresser Industries, Inc., Dallas, Tex.
 Filed Sept. 8, 1969, Ser. No. 855,939
 Int. Cl. B63b 21/00

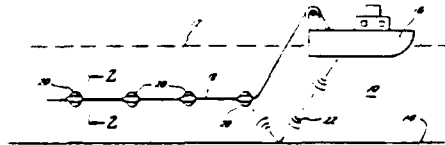
U.S. Cl. 114-235B

9 Claims

The present invention is directed to controllers for use in connection with cables that are towed beneath a body of water in order to maintain the cable in a desired position. The controller employs control planes or vanes vertically disposed on opposite sides of the controller for maintaining position in a horizontal plane, and vanes horizontally disposed on opposite sides to maintain position in a vertical plane. Standard reversible D.C. motors or D.C. torque motors are used to control the position of the vanes in response to signals transmitted from the towing or other vessel. A yoke arrangement allows simultaneous operation of each pair of vanes.

Keywords: Seismic streamer cable; Towed body depth control

U.S. Cl. X.R. 81-0.5PCR



3,605,774
MARITIME APPARATUS UTILIZABLE AS A HYDROCARBON RESERVOIR
 Pierre Launay, Versailles, and Tran Dinh Phat, Paris, France, assignors to Compagnie Industrielle de Travaux and Compagnie Francaise des Petroles, both of Paris, and Institut Francais du Petrole, des Carburants et Lubrifiants, Rueil-Malmaison, France
 Filed July 20, 1970, Ser. No. 56,289
 Claims priority, application France, July 30, 1969, 6,926,062
 Int. Cl. E02b 17/00, 1/00

U.S. Cl. 137-1

12 Claims

A marine installation for storing hydrocarbon liquids has a reservoir containing the hydrocarbon liquid and water beneath the hydrocarbon liquid. As the hydrocarbon liquid enters the reservoir water is removed. When the hydrocarbon liquid is removed water is added to maintain sufficient ballast in the installation to keep the installation immersed and in place.

Keywords: Offshore storage tank, emergent.

U.S. Cl. X.R. 61-.5; 61-46; 137-154; 137-565; 137-572



SEPTEMBER 21, 1971

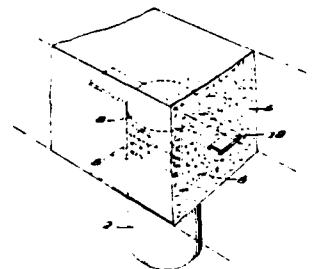
3,606,716
TIMBER PILING CONSTRUCTION
 David R. Norcross, Washington, D.C., and Hubert T. Dudley, Arlington, Va., assignors to Timber Engineering Company, Washington, D.C.
 Filed July 31, 1969, Ser. No. 846,510
 Int. Cl. E04c 3/34; E02d 5/54
 U.S. Cl. 52-301

5 Claims

A timber piling construction including an upright timber pile and a concrete slab supported on the upper end of the pile. A pair of connector plates are rigidly secured on opposite sides of the pile. The connector plates are in the shape of an angle with one leg having a plurality of nail holes for receiving nails driven into the wood pile. The other leg of the connector projects outwardly at the upper end of the pile. Concrete is cast over the connector and the upper end of the pile to form a unitary structure.

Keywords: Pile, structure connection; Pile, wood

U.S. Cl. X.R. 52-733; 61-53



3,607,741
OIL SLICK REMOVAL SYSTEM
 Alfred Sohnius, 2 Elmhurst Road, Baltimore, Md.
 Continuation-in-part of application Ser. No. 808,023, Mar.
 17, 1969, now abandoned. This application Feb. 19, 1970,
 Ser. No. 12,685
 Int. Cl. E02b 15/04, B01d 39/04
 U.S. Cl. 210-36 10 Claims

Physical means for removing oil slicks from water and other surfaces utilizing chemically treated cellulosic bulk material contained in enclosures of netting. The chemically treated material is hydrophobic but exhibits an affinity for oil. Oil thus gathered can be reclaimed.

Keywords: Pollutant absorption; Pollutant collection; Pollutant, mechanical removal

U.S. Cl. X.R. 210-40; 210-242; 210-484; 210-504; 210-505



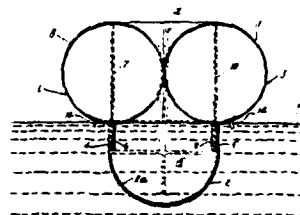
SEPTEMBER 28, 1971

3,608,316
**BUOYANT BARRIER AND METHOD FOR
 INSTALLING THE SAME**
 James E. Manuel, Belle Terre, N.Y., assignor to
 Versatech Corporation, Nesconset, N.Y.
 Filed Sept. 15, 1969, Ser. No. 357,792
 Int. Cl. E02b 15/04 20 Claims

A buoyant barrier is provided, as well as a method for installing the same, which makes it possible to establish the barrier to confine an oil spill at a remote location in a relatively short time after the spill has occurred. The barrier structure can be of flexible sheet material and is provided in light weight packaged form, ready for delivery by air, the structure being such that very high rates of deployment onto the surface of a body of water are practical. In its packaged form, the barrier structure is completely free of weights. In deployed form, the weight of the structure is supported by air-inflated buoyancy chambers, and the structure is stabilized by a chamber or chambers filled with water from the body of water on which the structure is deployed.

Keywords: Pollutant, surface barrier

U.S. Cl. X.R. 242-55



AD-A080 796

COASTAL ENGINEERING RESEARCH CENTER FORT BELVOIR VA
AN ANNOTATED BIBLIOGRAPHY OF PATENTS RELATED TO COASTAL ENGINE--ETC(U)
NOV 79 R E RAY, M D DICKEY, A M LYLES
CERC-HR-79-6-VOL-2-APP

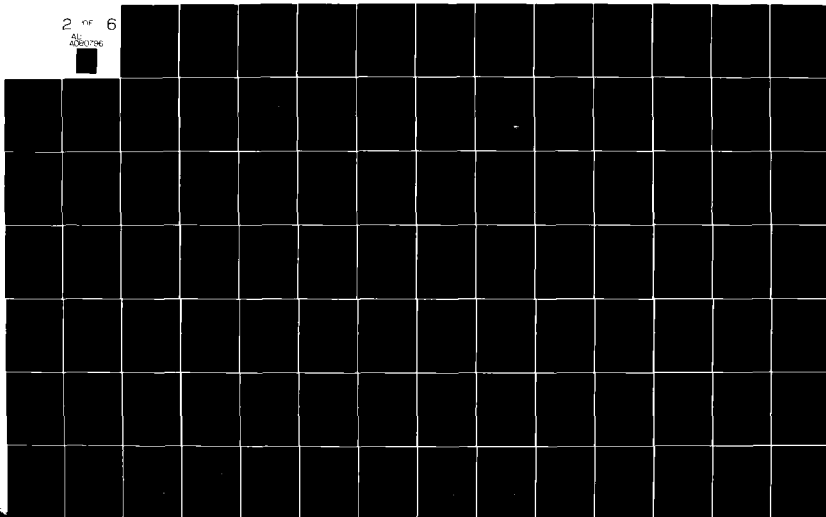
F/O 13/2

NL

UNCLASSIFIED

2 of 6

ALL
ADDITIONAL



3,608,320
**METHOD AND APPARATUS FOR CONSTRUCT-
 ING A CONCRETE WALL STRUCTURE IN OPEN
 WATER**

Andrew M. Filak, Palos Verdes Estates, Calif., assignor
 to Norse Development Corporation, Rye, N.Y.
 Filed Mar. 13, 1970, Ser. No. 19,296
 Int. Cl. E02d 5/40

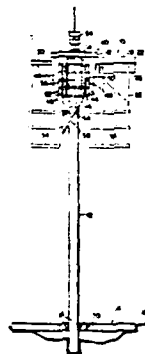
U.S. Cl. 61—46

13 Claims

A method and apparatus for constructing a wall structure such as a concrete caisson in open water by slip-forming from the top down. To carry out the method a guide structure is installed along the desired location of the wall and supported by the guide structure are a series of yoke members to which are fixed a pair of spaced apart slipforms. Hydraulic lowering jacks mounted on top of the yoke members control vertical jack rods, the lower ends of which are connected to a base retaining shoe. Pouring and finishing platforms are supported by the guide structure above and below the slipforms. The retaining shoe is initially connected to the lower edge of the slip forms and in constructing a caisson, is located just above the highwater line. The first pour fills the retaining shoe and when it has solidified, the jacks lower it evenly below the slipforms. As pouring and slipforming continues the shoe soon enters the water and the weight on the jacks is reduced by the water displaced. When the retaining shoe reaches the bottom, water may be applied through passages formed in the shoe to provide jet outlets along its inner and outer surfaces. The water jets aid in helping the shoe to penetrate into the ocean or lake floor to provide a firm footing for the wall or caisson.

Keywords: Concrete form; Offshore caisson; Offshore construction; Pile driver, water jet; Pile-driving shoe; Seabed foundation

U.S. Cl. X.R. 61-52



3,608,651
**APPARATUS FOR DRIVING ELONGATED ELEMENTS
 INTO UNDERWATER GROUNDS**

Roger Tindy, Bougival, Yvelines, and Andre Castela, Mesnil
 LeRoi, Yvelines, both of France, assignors to Institut Fran-
 cais du Pétrole des Carburants et Lubrifiants, Rueil Mal-
 maison (Hauts de Seine), France

Filed June 26, 1969, Ser. No. 836,713

Claims priority, application France, June 27, 1968, PV

156985

Int. Cl. E21b 7/12

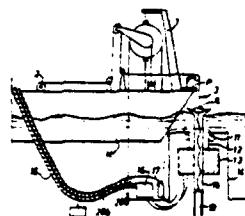
U.S. Cl. 175—6

4 Claims

An apparatus for driving elongated elements such as piles, sheet pilings or tubes into the underwater grounds being operated from a central installation and including a device for generating directed periodic impulses, which device is submerged together with the element. The apparatus further includes assembly-supporting means comprised by the impulse-generating device and the element to be driven and being stationary with respect to the water bottom.

Keywords: Embedment anchor; Offshore construc-
 tion; Pile driver, vibratory; Pile
 placement; Sampler, seabed-driven
 core

U.S. Cl. X.R. 175-171



3,608,727
APPARATUS FOR REMOVING OIL AND DEBRIS FROM
WATER

James F. Grutsch, Hammond, and Russell C. Mallatt, Crown
Point, both of Ind., assignors to Standard Oil Company,
Chicago, Ill.

Filed Mar. 18, 1970, Ser. No. 20,508
Int. Cl. E02b 15/04

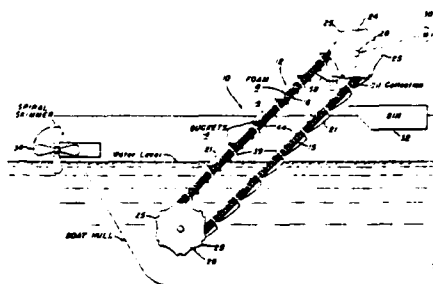
U.S. Cl. 210-242

6 Claims

Oil, solid particles such as biological slime and floating debris etc. are removed from water by an apparatus including endless chain means made up of a series of interconnected foraminous chambers holding a regenerable porous filter material such as polyurethane. Preferably the filter material has an outer large pore section and an inner small pore section. A plurality of buckets are attached to the chain means, and as the chain means moves through a closed loop path, these buckets catch debris and dump it into a holding bin. Simultaneously, the filter material absorbs surface and sub-surface oil and the like from water traveling through the filter material. The filter material is regenerated by squeezing the filter material to release the oil.

Keywords: Pollutant absorption; Pollutant
debris; Pollutant, mechanical
removal

U.S. Cl. X.R. 210-350; 210-391; 210-400;
210-DIG. 21



3,608,728
OIL SKIMMER
Leslie E. Trimble, 1341 West Vista Way, Vista, Calif.
Filed Oct. 15, 1969, Ser. No. 866,561
Int. Cl. E02b 15/04

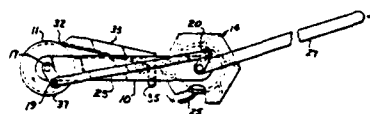
U.S. Cl. 210-242

7 Claims

A skimmer for removing oil from the surface of water which includes a cylindrical float mounted to a frame so that the float may rotate with its axis parallel to the surface of the water, a second float connected to the other through the frame with paddles that cause the second float to rotate and actuate a bellcrank and connecting rod system to rotate the cylindrical float. A scraper contacts the upper surface of the cylindrical float to remove oil collected on the surface of the float and allows it to drain down the trough in the scraper into a drainpipe that will flow the oil into a reservoir for storage. In operation, a push-bar frame is attached to the second float having paddle vanes and the entire apparatus would be pushed by a boat, thereby using the motion through the water to actuate the paddle wheel to rotate the oil skimmer float to pick up oil from the surface.

Keywords: Pollutant, mechanical removal

U.S. Cl. X.R. 210-354



OCTOBER 5, 1971

3,610,037

SEA WATER CESIUM SAMPLER

Michael L. Greene, Hillcrest Heights, Md., and Joseph Richard Jadamec, Woodbridge, Va., assignors to the United States of America as represented by the Secretary of the Navy

Filed Mar. 26, 1970, Ser. No. 22,943

Int. Cl. G01m 1/10

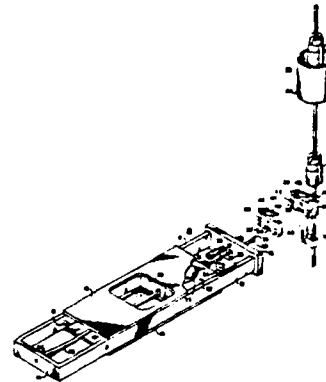
U.S. Cl. 73—170 A

3 Claims

Keywords: Sampler, water

U.S. Cl. X.R. 73-425.4

A water sampling device having a rectangular frame to which is attached on the top and bottom thereof a pair of centrally apertured parallel plates. A shuttle is slideably mounted between the centrally apertured plates within the frame and biased toward one end thereof by an elastic band attached to one end of the shuttle. The shuttle is restrained from movement by a pair of lanyards attached to the other end thereof, one of which connects to a first latch and the other of which connects to a second latch. The first lanyard holds the shuttle out of alignment with the apertures in the parallel plates but may be released from the latch by a messenger sliding down the cable to which the frame is attached. The shuttle is then free to move under the influence of the elastic band until it is stopped by the second lanyard in alignment with the apertures in the parallel plates and thus is fully exposed to contact with the sea water. A second messenger having a tubular portion is later dropped down the wire to telescope with the first messenger and open the second latch which releases the second lanyard and allows the shuttle to be moved by the elastic band out of alignment with the apertures in the parallel plates. The shuttle is again isolated from contact with the sea water and secure from contamination by the water column through which the device is hoisted back aboard the surface vessel.



3,610,038

WAVE METER

Robert D. Joy and Russell F. Colton, Cedar Rapids, Iowa, assignors to J-Tec Associates, Incorporated, Cedar Rapids, Iowa

Filed June 30, 1970, Ser. No. 51,222

Int. Cl. B63b 21/52

U.S. Cl. 73—170 A

16 Claims

A wave meter comprises a surface float, an inter-connecting cable that is elastic along a portion of its length and a reference plate. The inter-connecting cable connects the surface float to the reference plate which is suspended below the surface deep enough so that it is immune to water particle motion caused by surface waves. The reference plate operates on an umbrella principle whereby it expands at its deep location to create a relatively large virtual mass. Inside of the surface float, the inter-connecting cable is attached to a strain gage. The strain gage modifies a DC voltage which is converted into a frequency variable signal that is then transmitted to a remote receiver by a transmitter located inside of the surface float, via an antenna located on top of the surface float.

Keywords: Buoy, instrumented; Wave measurement

U.S. Cl. X.R. 9-8R



3,610,039

DUCTED WAVE METER

Jack Althouse, Escondido, Duane E. Maddux, Santee, and Noel B. Plutchak, San Diego, Calif., assignors to The Bendix Corporation

Filed Apr. 28, 1969, Ser. No. 819,866

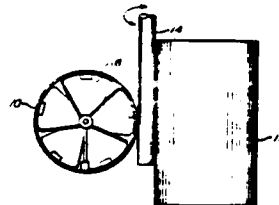
Int. Cl. G01w 1/00; G08b 21/00; G01d 3/44

U.S. Cl. 73-189 7 Claims

Keywords: Wave measurement

U.S. Cl. X.R. 73-231; 324-168; 340-263

A meter for measuring wave characteristics is disclosed in which a pair of orthogonally positioned sensors are carried in the water on a pivotable shaft, each meter including an impeller contained in a shroud which prevents its responding to wave motion components other than those substantially parallel to its axis. Typically these meters are positioned to sense horizontal and vertical components of wave motion, and each produces an electrical pulse output whose frequency and pulse timing relationship varies with the velocity and direction, respectively, of the flow past the impeller. The pulse outputs are connected to amplification and gating circuits and time constant circuits producing an output which may consist of a series of pulses whose polarity and frequency are directly proportional to the direction and velocity of the impeller rotation, or which may be a substantially uniform direct current voltage whose polarity varies with direction of flow and whose magnitude is proportional to the average velocity of flow through the impeller integrated over a significant period, depending upon whether short term instantaneous peak values are desired, or longer term average values. The output signal may be utilized by any of a number of output devices such as a strip chart, a digital counter, etc.



3,610,357

SEISMIC SOUND SOURCE

William J. Neal, Manvel; Joseph H. Rosenbaum, Houston, and Thomas F. Vining, Houston, all of Tex., assignors to Shell Oil Company, New York, N.Y.

Filed June 16, 1969, Ser. No. 833,571

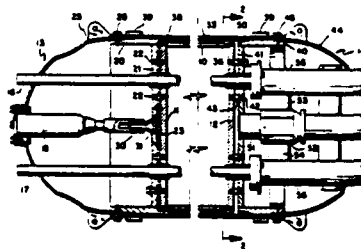
Int. Cl. G10k 1/100

U.S. Cl. 181-0.5 3 Claims

Keywords: Seismic explosive acoustic transmitter

U.S. Cl. X.R. 181-0.5 NC

A seismic source for use in water-covered areas wherein an explosive gas mixture is detonated within a closed chamber having a flexible wall. The gas is contained within a volume formed between a rigid impermeable inner wall and a flexible impermeable outer wall. The products of the detonation are exhausted first to the atmosphere and then into an evacuated chamber before the hydrostatic pressure has completed the inward flexing of the flexible outer wall.



3,610,366
SYSTEM FOR MARINE SEISMIC EXPLORATION
 Seymour Goldberg, Lexington, Mass., assignor to EG&G,
 Inc., Bedford, Mass.
 Filed Apr. 4, 1969, Ser. No. 813,625
 Int. Cl. G01v 1/00

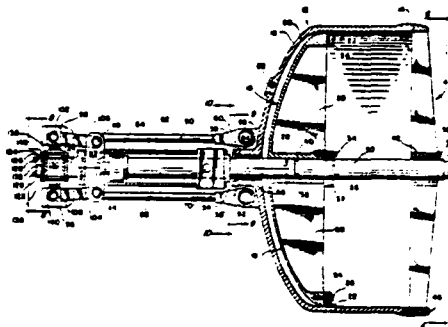
U.S. Cl. 181-0.5

27 Claims

A system of marine seismic exploration is provided utilizing the force exerted by the ambient pressure of the water to accelerate a piston inwardly toward the closed end of a partially evacuated cylinder, followed by the controlled rebound of the piston due to the compression of the gas contained in the cylinder, to produce acoustic pulses.

Keywords: Seismic explosive acoustic transmitter; Seismic implosive acoustic transmitter

U.S. Cl. X.R. 116-137; 340-7; 340-8; 340-17



OCTOBER 12, 1971

3,611,595
**SUCTION DREDGER AND METHOD OF
 SUCTION DREDGING**
 Jan de Koning, Amsterdam, Netherlands, assignor to
 N.V. Ingenieursbureau voor Systemen en Octroolen
 Spanstaal, Rotterdam, Netherlands
 Continuation-in-part of application Ser. No. 524,934,
 Feb. 3, 1966. This application Aug. 8, 1969, Ser.
 No. 866,050
 Claims priority, application Netherlands, Feb. 4, 1965,
 6501404

U.S. Cl. 37-58

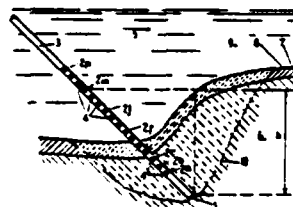
Int. Cl. E02f 3/92

11 Claims

Method and apparatus for suction dredging particulate material such as sand. A suction pipe is inserted into a body of sand below the bottom of a body of water to withdraw a water-sand suspension having a desired concentration of sand in such suspension. At the lower end of the pipe, the sand is drawn in at very high concentration and at some level above this point water is separately introduced and the desired concentration is obtained by adjusting the level at which the water is introduced. The concentration of the resulting suspension is measured to enable the level of water introduction to be adjusted properly.

Keywords: Dredge, suction; Dredge intake

U.S. Cl. X.R. 37-195; 137-4; 137-92; 302-15; 302-58



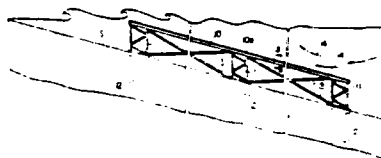
3,611,727
WAVE-FORMING STRUCTURE
 Robert R. Blandford, 1809 Paul Spring Road,
 Alexandria, Va. 22307
 Filed Feb. 26, 1970, Ser. No. 14,291
 Int. Cl. E02b 3/02

U.S. Cl. 61-1 10 Claims

An artificial structure is provided offshore to provide an artificial sea-bottom surface of suitable shape to form waves thereon of a desired type from arriving deep-ocean waves for surfers and swimmers disposed on or above the artificial sea-bottom surface.

Keywords: Breakwater, steel frame

U.S. Cl. X.R. 61-5

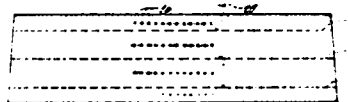


3,611,728
**STRUCTURE FOR CONFINING AND STORING
 FLOATING LIQUID PRODUCTS**
 Gustaaf Van't Hof, 10021 Lesterford Ave.,
 Downey, Calif. 90240
 Filed June 2, 1969, Ser. No. 829,303
 Int. Cl. E02b 15/04

U.S. Cl. 61-1 F 7 Claims

A flexible enclosure formed from a plurality of buoyant vertical members joined side-by-side in a substantially liquid-tight relationship for containing and storing a liquid which floats upon the surface of another liquid.

Keywords: Pollutant, surface barrier



3,611,732
METHOD FOR STABILIZING SILT
 Michael M. Epstein, 2885 Scottwood Road,
 Columbus, Ohio 43209
 No Drawing. Filed July 30, 1969, Ser. No. 846,243
 Int. Cl. C09k 3/08; E02d 3/12

U.S. Cl. 61-36 9 Claims

This invention is a method for stabilizing silt in the bottom of a body of water, particularly the oceans, which consists of depositing a gel of a water-soluble polymer, preferably as a coating or blanket, onto the surface of the silt while simultaneously rendering the gel water insoluble as with an insolubilizing and gelling agent.

Keywords: Seabed soil treatment

No Figure

3,611,734
**FOUNDATION ANCHOR FOR FLOATING
 MARINE PLATFORM**
 George E. Mott, Metairie, La., assignor to
 Texaco Inc., New York, N.Y.
 Filed Feb. 17, 1970, Ser. No. 11,998
 Int. Cl. B63b 35/44

U.S. Cl. 61-46.3 12 Claims

The invention relates to a separable component foundation anchor adapted for positioning an offshore floating platform or other floatable vessel at a desired deep water well drilling site. The anchor includes a relatively heavy pilot member and a submergible casing or ballast section. The anchor further includes means to engage the lower end of the offshore platform to minimize movement of the latter at the water's surface. The ballast section cooperates with the pilot member, functioning sequentially as a transport means to the offshore site, and after being ballasted and submerged supplements the weighted pilot section. Said ballast section further may hold a quantity of fluids used in an oil drilling or producing operation such as drilling mud, crude oil and the like whereby to minimize the need for additional platform space to store such materials.

Keywords: Offshore platform anchor; Offshore platform, floating

U.S. Cl. X.R. 114-5D; 114-206



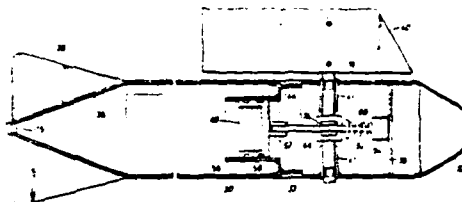
3,611,975
PARAVANE DEVICE
 Clifford Logan Ashbrook, 5077 Cheena, Houston, Tex.
 Filed Aug. 15, 1969, Ser. No. 850,555
 Int. Cl. B63b 21156, 17.00
 U.S. Cl. 114—235 B

8 Claims

A paravane for maintaining a seismic cable being towed through the water at a predetermined distance above the water floor. The paravane includes a cylindrical body characterized by diametrically opposed wing members actuated by an air pressurized piston which moves the wing members into an ascending or descending position. Predetermined operating depths of the paravane is accomplished by resisting spring means acting in opposition to movement of the pressurized piston. The diving depth of the device may be varied by adjustment of the resisting means and air pressure so as to accomplish uniform depth control of all the paravanes which are connected to the seismic cable.

Keywords: Depth pressure measurement;
 Seismic streamer cable; Towed
 body depth control

U.S. Cl. X.R. 340-7



3,611,976
**LOW-DRAG FAIRING CONFIGURATION FOR
 FLEXIBLE TOWING CABLES**
 Neville E. Hale, Port Credit, Ontario, and Kenneth Gardner,
 Mimico, Ontario, both of Canada, assignors to Fathom
 Oceanology Limited, Port Credit, Ontario, Canada
 Filed Nov. 12, 1969, Ser. No. 875,864
 Claims priority, application Great Britain, Nov. 23, 1968,
 55708/68
 Int. Cl. B63b 21/00
 U.S. Cl. 114—235 F

7 Claims

A cable fairing has a flexible hollow nose and a rigid tail; the fairing is in short sections with each adjacent pair connected by flexible pivotal links.

Keywords: Towing cable



3,612,188
NOISELESS PILE DRIVER
 Takesosuke Ono, Tokyo, Japan, assignor to North Engineer-
 ing Co., Ltd.
 Filed July 10, 1970, Ser. No. 53,877
 Int. Cl. E02d 7/00
 U.S. Cl. 173—122

7 Claims

A pile-driving apparatus in which the inertia of a reciprocated weight produces a force impulse at one end of each stroke which is applied to the head of a pile via an impact-enforcing mechanism which includes resilient means such as a cushion of air or oil, thereby driving the pile in a relatively quiet manner without the noise of hammer impacts.

Keywords: Pile driver, impact

U.S. Cl. X.R. 173-116; 173-131; 173-139



3,612,277
METHOD OF RECOVERING OIL FROM AN OIL SLICK
 Merle H. Van Stavern; Wylie T. Jones; Howard F. Cossey,
 and Wendall J. Clark, all of Richmond, Va., assignors to
 Texaco Inc., New York, N.Y.
 Filed June 15, 1970, Ser. No. 46,057
 Int. Cl. B01d 17/02

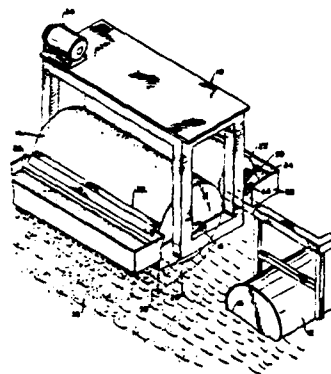
U.S. Cl. 210-83

2 Claims

A rotatable drum type of oil skimmer which is continually rotated to pick up a film of oil and water on the surface of the drum, having a supplemental or transfer drum located substantially above the oil slick and well out of contact therewith, so as to come into contact with film on the pickup drum and receive a portion of the film, product oil being recovered from both drums.

Keywords: Pollutant, mechanical removal

U.S. Cl. X.R. 210-179; 210-242; 210-523



3,612,280
OIL-SKIMMING APPARATUS
 Hugh J. Fitzgerald, Austin, and Ernest H. Koepf, Dallas, both
 of Tex., assignors to Ocean Pollution Control, Inc., Dallas,
 Tex.

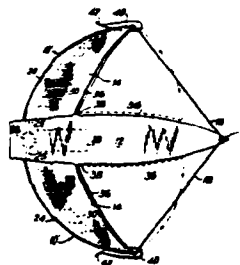
Filed Jan. 21, 1970, Ser. No. 4,602
 Int. Cl. B01d 21/18

U.S. Cl. 210-242

9 Claims

A pair of wing assemblies attached to opposite sides of the hull of a marine vessel, each including a cover with tensioning means engaging its outer end to keep it extended outwardly, means to support its leading edge above the water to allow oily material at the surface to pass beneath it, an angled skirt portion at its trailing edge to funnel the oily material inwardly toward the vessel, conduits at the hull of the vessel to remove the oil, and lines engaging the outer ends of the wing members for hauling them inwardly to clear lateral obstructions.

Keywords: Pollutant collection; Pollutant removal watercraft; Pollutant, suction removal; Pollutant, surface barrier



3,613,071
**SIMULTANEOUS DUAL SEISMIC SPREAD
 CONFIGURATION FOR DETERMINING DATA
 PROCESSING OF EXTENSIVE SEISMIC DATA**
 Roy G. Quay, San Antonio, Tex., assignor to Petty Geophysical
 Engineering Company, San Antonio, Tex.
 Filed Dec. 24, 1969, Ser. No. 888,044
 Int. Cl. G01v 2/16

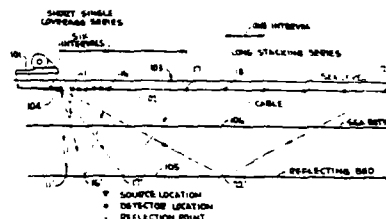
U.S. Cl. 340-7

13 Claims

Signals from the same seismic source are simultaneously recorded from two groups of seismic detector arrays. The two groups have detector arrays and array intervals unique to each group. The group closest to the seismic source accentuates shallow reflections and is characterized by: (1) closely spaced detectors in each array forming short arrays with short distances between array centers, (2) nearness to the source, (3) usually sampled and filtered to resolve high-frequency data, and (4) a low order of multiple coverage. The group more remote from the seismic source enhances the deeper reflections and is characterized by: (1) long arrays with long distances between array centers, (2) a location a mile or two from the source, (3) sampling and filtering to resolve low-frequency data, and (4) a high order of multiple coverage. A factor, i.e., number of detector arrays times the spacing between array centers divided by the multiplicity of coverage, for one group must be equal to the corresponding factor for the other group, although the multiplicities of coverage of the two groups are very different. The near group data determines the processing techniques and corrections for the mass of data from the far group.

Keywords: Seismic hydrophone array; Seismic streamer cable; Seismic survey method

U.S. Cl. X.R. 340-15.5 MC



OCTOBER 19, 1971

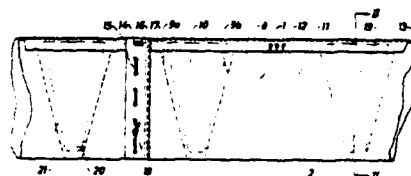
3,613,376
**FENCE FOR ENCLOSING IMPURITIES
 FLOATING ON WATER**
 Bo Midby, Kaprifolvägen 31, Kungälv, Sweden
 Filed May 12, 1969, Ser. No. 823,604
 Int. Cl. E02b 15/04

U.S. Cl. 61-1

6 Claims

A fence for enclosing impurities floating on water, having an elongated two layer piece of material with spaced apart pockets provided by connections to the two layers of material which pockets have openings facing one longitudinal edge of the material and floats and weights in said pockets capable of keeping the fence floating in water with the sides of the fence substantially vertical and the longitudinal edges of the fence substantially parallel with the surface of the water.

Keywords: Pollutant, surface barrier

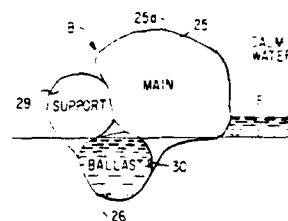


3,613,377
MULTICHAMBER FLOATING BARRIER
 Ramon Earl Zaugg, 14223 Georgia Ave., Apt. 103,
 Silver Spring, Md. 20910
 Filed July 30, 1969, Ser. No. 846,071
 Int. Cl. E02b 15/04

U.S. Cl. 61—1 F 11 Claims

A multiple-chamber barrier of flexible material adapted to float near the surface of a liquid and confine to a restricted area thereof buoyant materials floating on that surface. The barrier is particularly useful in connection with the present illustrative example for confining buoyant materials such as oil floating on the surface of a body of water, especially during adverse weather or sea conditions when wave activity is high and wind tends to spread the floating material rapidly away from its source, i.e. an oil leak. The present barrier comprises multiple chambers joined to form, when floating, a triangular cluster of flexible bag-like tubes including a ballast chamber partly filled with water and virtually immersed beneath the other chambers so that it lies mostly submerged, a main chamber partially inflated with air and rising above the water surface like a large continuous pillow, and a support chamber more firmly inflated with air and lying above the top of the ballast chamber and behind the main air chamber to help support the latter when the wind tries to beat it flat on the water surface. The invention includes means for manipulating the ends of the chambers including inflating and sealing them, and means for storing and reeling out the barrier to whatever length of it is required under actual working conditions.

Keywords: Pollutant collection; Pollutant, surface barrier

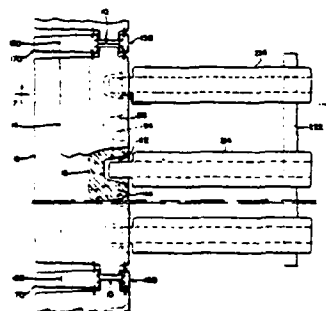


3,613,382
SEA WALL CONSTRUCTION
 Bryan J. Dickinson, Des Moines, Wash., assignor to West
 Construction Enterprises, Inc., Des Moines, Wash.
 Filed Aug. 6, 1969, Ser. No. 847,886
 Int. Cl. E02b 3/08; E02d 5/00; E04b 2/08
 U.S. Cl. 61—49 31 Claims

Modular sea wall structure utilizing steel beam bearing pilings between and on which are supported modular concrete block units. The pilings are driven as deeply as required to give firm support and the bottommost concrete block unit is positioned between and resting on two adjacent pilings at a preselected depth below or above the bottom surface. The top block is post-tensioned and the intermediate blocks are designed along with the other structural components to hold the geometry of the wall. All steel parts, namely, pilings and pretensioned cables, are sealed or isolated from the corrosive effects of water and air. Flexibility of movement is maintained between component parts such as blocks and pilings.

Keywords: Concrete block; Offshore construction; Pile, steel; Seawall

U.S. Cl. X.R. 52-492; 52-596; 61-58



3,613,446
SELF-RECORDING ACCELEROMETER
 Ronald F. Scott, Altadena, Calif., assignor to
 California Institute of Technology

Filed Nov. 5, 1968, Ser. No. 773,489
 Int. Cl. G01n 1/00; G01v 9/00; G01d 9/10
 U.S. Cl. 73-170 27 Claims

A self-recording, single-axis accelerometer is provided by utilizing a mass, which moves against a bellows-type spring force, in the form of a cylinder to carry a chart. A lead screw parallel to the cylinder axis, and geared thereto, advances a stylus assembly from one end of the drum to the other as the cylinder is rotated at constant speed. When subjected to acceleration, the cylinder is displaced along its axis, thereby causing the trace of the stylus to depart from its helical path in proportion to the magnitude of the acceleration, and in a direction corresponding thereto. A method is disclosed for obtaining information on the strength of ocean-floor soils by instrumenting conventional shallow or deep-ocean sampling, coring or other apparatus with a single-axis accelerometer.

Keywords: Instrument power supply; Instrument, seabed in situ; Sampler, seabed-driven core; Seabed property measurement

U.S. Cl. X.R. 73-84; 73-421; 346-7

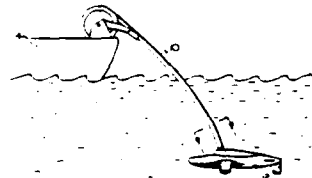


3,613,627
HIGH SPEED FAIRED TOWING CABLE
 Paul B. Kennedy, Bellevue, Wash., assignor to The Boeing Company, Seattle, Wash.
 Filed June 15, 1970, Ser. No. 46,189
 Int. Cl. B63b 21/00; H01b 7/12
 U.S. Cl. 114-235 F 8 Claims

A low-drag underwater towing cable having a high stability at high towing speeds. The cable comprises an elongated hydrofoil-shaped structure with a leading edge made from continuous unidirectional glass fibers bonded together and a trailing edge made from flexible material such as plastic, rubber, or the like. An elastomer impregnated cross-woven material covers and encloses the leading and trailing edge portions. Braided electrical conductors are led through the trailing edge at a predetermined location nearest the leading edge for preventing tension forces and for avoiding interference with trailing edge yielding properties.

Keywords: Towing cable

U.S. Cl. X.R. 174-101.5

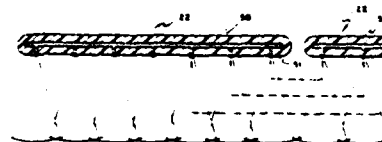


3,613,823
DOUBLE-BUBBLE SPARK ARRAY
 Eric C. Burrage, Pearland, Tex., assignor to Shell Oil Company, New York, N.Y.
 Filed June 30, 1969, Ser. No. 837,797
 Int. Cl. G01v 1/00
 U.S. Cl. 181-0.5 6 Claims

A spark-type seismic sound source for use in water-covered areas wherein electrical power is discharged through a plurality of electrodes without the use of a ground plate.

Keywords: Seismic acoustic transmitter array; Seismic explosive acoustic transmitter

U.S. Cl. X.R. 340-9; 340-12



3,613,824
**PNEUMATIC ACOUSTIC SOURCE EMPLOYING
 ELECTROMAGNETICALLY CONTROLLED VALVE**
 George B. Loper, Duncanville, Tex., assignor to Mobil Oil
 Corporation
 Continuation-in-part of application Ser. No. 663,800, Aug.
 28, 1967, now Patent No. 3,506,085, dated Apr. 14, 1970.
 This application Jan. 27, 1970, Ser. No. 6,092
 Int. Cl. G01v 1/02

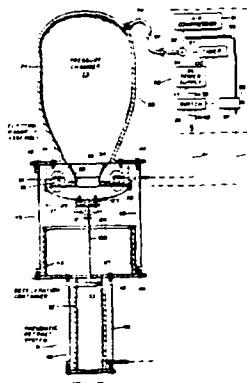
U.S. Cl. 181—.5

4 Claims

The specification discloses an acoustic source having a chamber for receiving gas. A valve is provided for confining gas under pressure in the chamber. An electromagnet is employed for holding the valve in its closed position and for releasing the valve to release the pressurized gas from the chamber by way of a port extending through the electromagnet. In the valve's closed position, a seal is formed between the two opposing surfaces of the electromagnet and the valve around the port and spaced inwardly from the outer boundaries of the two surfaces. In the preferred embodiment, a cylindrical member is supported to extend from the electromagnet and to surround the valve when it is in its closed position. A clearance exists between the outer periphery of the valve and the inside diameter of the cylinder whereby there is a lack of fluid seal formed between the cylinder and the valve.

Keywords: Seismic explosive acoustic trans-
 mitter

U.S. Cl. X.R. 251-30



3,613,891
OIL REMOVAL APPARATUS
 Charles C. Cloutier, Morgan City, La., assignor to Anti-
 Pollution Inc., Morgan City, La.
 Filed Mar. 24, 1970, Ser. No. 22,170
 Int. Cl. B01d 17/02

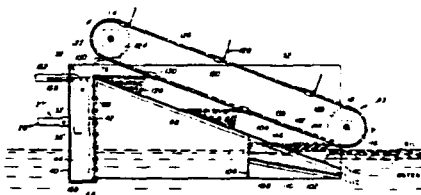
U.S. Cl. 210—242

36 Claims

An apparatus for removing a layer of a floating liquid such as oil from the surface of a body of water is disclosed, comprising a flexible boom which confines the liquid so that it can be removed by a scoop unit. The scoop unit has a plurality of paddles which cooperate with a bottom plate to enclose and seal off a portion of the oil slick so that the oil and water in the sealed-off portion will separate in layers. The bottom plate has a plurality of apertures which permit the water and a small amount of the oil in the sealed-off portion to flow therethrough, the water flowing back into the body of water while the small amount of oil is trapped between the surface of the body of water and the bottom plate. This portion of trapped oil acts as a check valve to permit the water enclosed on subsequent passes of the paddles to pass through the holes in the bottom plate and to prevent the oil picked up on these subsequent passes from flowing through the apertures. After separation of the oil and water, the oil is carried by the paddles to a sump, for removal to a storage area.

Keywords: Pollutant collection; Pollutant,
 mechanical removal; Pollutant,
 surface barrier

U.S. Cl. X.R. 210-DIG.21; 210-526



OCTOBER 26, 1971

3,614,837
**APPARATUS FOR DREDGING AND SIFTING
MUD, SANDS OR GRAVEL**

Toshinobu Araoka, 1308 Oaza-Orio, Yahata-ku,
Kitakyushu, Fukuoka Prefecture, Japan
Filed June 5, 1969, Ser. No. 830,747

Claims priority, application Japan, June 13, 1968,
43/50,509; July 9, 1968, 43/48,623; Sept. 2,
1968, 43/63,539, 43/76,520

Int. Cl. E02f 3/92, 3/94

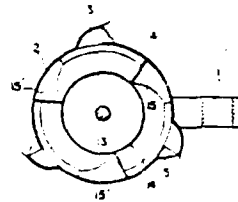
U.S. Cl. 37—57

1 Claim

A device for dredging up and sifting mud, sand and gravel, which device comprises a boom that can be dipped into water from aboard a ship or from the land, a scoop-carrying drum rotatably mounted on the end of the ladder, scoops on the periphery of the drum, a collecting space within the drum and partitioned from each scoop by means of a screen, and a suction pipe one end of which opens to the collecting space through one side of the drum while its other end projects above the surface of the water.

Keywords: Dredge, cutterhead; Dredge intake

U.S. Cl. X.R. 37-66; 37-189



3,614,866
**POLYPOD STRUCTURE FOR CIVIL
ENGINEERING USES**

Taisuke Kaneko, Ehime-ken, and Fumiyasu Morioka,
Sapporo-shi, Hokkaido, Japan, assignors to Kyowa
Concrete Kogyo Kabushiki Kaisha Sapporo-shi, Hok-
kaido, Japan

Filed Apr. 1, 1969, Ser. No. 811,983

Claims priority, application Japan, Feb. 21, 1969
(utility model), 44/15,388

Int. Cl. E02b 3/04, 3/12, 3/14

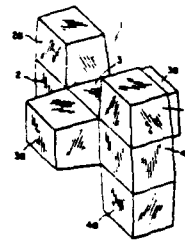
U.S. Cl. 61—3

8 Claims

A polypod block is composed of at least three pillar-shaped parts integrally joined with alternately crossed relationship, the block thereby having at least six legs, and the dimensions and shape of the block are so selected that a large number of these blocks can be interlocked in several ways to form tightly assembled combinations of the blocks for purposes such as wave breaking, soil erosion control, and dissipation of the energy of flowing water.

Keywords: Concrete armor unit

U.S. Cl. X.R. 61-4; 61-37



3,614,871
**METHOD APPARATUS AND DOCK MEMBER
COMPONENTS FOR ERECTING, ALIGNING, RE-
ALIGNING, OR DISASSEMBLING A DOCK
MEMBER**

Edwin A. Nordell, Lyndhurst, Ohio, assignor to The
Metal Craft Company, Chardon, Ohio
Filed June 14, 1968, Ser. No. 737,159
Int. Cl. E02b 3/20

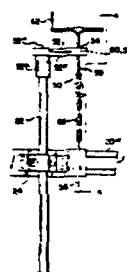
U.S. Cl. 61-48

5 Claims

Method, apparatus and dock member component or components for erecting, disassembling, aligning and/or realigning a dock member easily erectable (as a complete dock, a modular dock component, or an extension of on an existing dock) by a single person even in deep water without the use of boats and without getting wet; and including a dock deck elevator, dock member post clamp bracket, a connector for operatively connecting two dock members, and or combination member connector and post clamp bracket, etc.

Keywords: Offshore construction; Pier, fixed;
Pier, mobile; Small-craft pier

U.S. Cl. X.R. 61-65; 182-144



3,614,873
FREEZING OIL SPILLS
Edward L. Cole, Fishkill, and Howard V. Hess, Glenham,
N.Y., assignors to Texaco Inc., New York, N.Y.
Filed Oct. 1, 1969, Ser. No. 862,716
Int. Cl. F25c 5/00

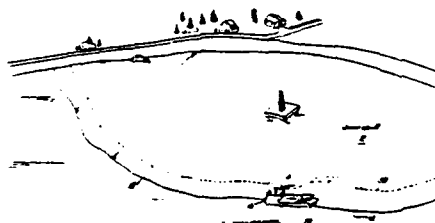
U.S. Cl. 62-66

6 Claims

Cleaning up marine oil spills by freezing the surface layer of oil, preferably with particles of Dry Ice or the like, to enable the layer to be screened off the surface as a cake.

Keywords: Pollutant coalescence; Pollutant,
mechanical removal; Pollutant,
surface barrier

U.S. Cl. X.R. 62-123; 210-71; 210-242



3,615,017
**OIL ENTRAPMENT AND CONTAINMENT
 WATERCRAFT**

Joe M. Valdespino, 5023 Golf Club Parkway,
 Orlando, Fla. 32808
 Filed Dec. 15, 1969, Ser. No. 884,899
 Int. Cl. E02b 15/04

U.S. Cl. 210-242

10 Claims

An oil slick entrapment and containment watercraft has a pair of pontoons buoyantly supporting an open-bottomed entrapment tower and a funnel-shaped surface skimming shroud. The open bottom of the entrapment tower is below the water level, and, as the craft moves on the water having an oil slick, the oil passes into the skimmer and into the entrapment tower where the column of liquid is raised by vacuum applied to the top of the entrapment tower. Oil rises to the top of the water in the entrapment tower due to the difference in specific gravity and without emulsifying and is then pumped off the top. A single pump carried by the craft is connected by suitable piping arrangements and provides multiple functions including; drawing vacuum in the entrapment tower by aspirating air from the entrapment tower through an aspirator, supplying air to the pontoons, and pumping the oil from the entrapment tower. The buoyancy of the pontoons is controlled by supplying air and water to the top of the pontoons allowing the water to escape out of a slot in the bottom of the pontoons and providing air purge lines in the pontoons.

Keywords: Pollutant removal watercraft;
 Pollutant, suction removal

U.S. Cl. X.R. 210-DIG.21



3,616,418
**ANODE ASSEMBLY FOR CATHODIC PROTECTION
 SYSTEMS**

Edward P. Anderson, Livingston, N.J.; Paul B. Byrne,
 Warren, N.J., and Risque L. Benedict, Upland, Calif.,
 assignors to Engelhard Minerals & Chemicals Corporation
 Filed Dec. 4, 1969, Ser. No. 882,127
 Int. Cl. C23f 13/00

U.S. Cl. 204-196

4 Claims

An anode assembly for cathodic protection systems, especially for the cathodic protection of submerged spaced supporting legs of offshore platforms, comprising an elongated carrier cable adapted for spanning the spaced submerged legs of the platform and carrying an elongated anode along the length of the cable intermediate the ends thereof, the anode being spaced from the connecting ends of the cable to provide for substantially uniform current distribution to the platform legs.

Keywords: Cathodic protection; Corrosion
 prevention; Offshore platform,
 leg

U.S. Cl. X.R. 204-286; 204-290F; 204-297



3,616,422
GALVANIC ANODE
 Gordon L. Doremus, and Jack G. Davis, both of Houston,
 Tex., assignors to Cathodic Protection Service, Houston,
 Tex.

Filed Apr. 21, 1969, Ser. No. 817,916
 Int. Cl. C23f 13/00

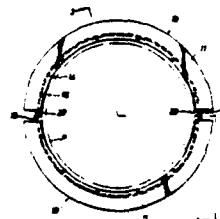
U.S. Cl. 204-197

5 Claims

A galvanic anode adapted particularly for the cathodic protection of relatively large diameter pipelines submerged in water bodies. The anode consists of a pair of semicylindrical segments constructed of a suitable galvanic metal and having completely embedded within the galvanic metal steel core or armature sections, adapted to be connected together to join the anode sections into a "bracelet" about the pipe.

Keywords: Cathodic protection; Corrosion
 prevention

See: Re. 27,529



NOVEMBER 2, 1971

3,616,774

FLOATING DOCK STRUCTURE

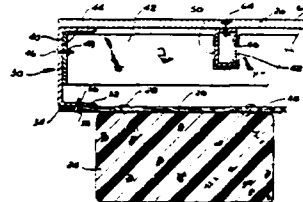
Kenneth L. Thompson, Huntington Beach, Calif.,
assignor to Ye Dock Masters, Inc.
Filed Aug. 15, 1969, Ser. No. 850,608
Int. Cl. B63b 35/00

U.S. Cl. 114—5

13 Claims

A floating dock structure wherein flotation members support longitudinal frame members which, in turn, support decking for the dock. A plurality of flooring members can be secured to the flotation members and the frame members can be metal channels secured to the floor members. Tying members are secured transverse of the structure, between the channels and support longitudinal underpinning members, extending the length of the structure, to which the decking is secured.

Keywords: Pier, floating; Small-craft pier



3,617,552

OIL-WATER SEPARATING PROCESS

Robert G. Will, Munster, and James F. Grusch, Hammond,
both of Ind., assignors to Standard Oil Company, Chicago,
Ill.

Filed Mar. 18, 1970, Ser. No. 20,510
Int. Cl. E02b 15/04; B01d 23/24

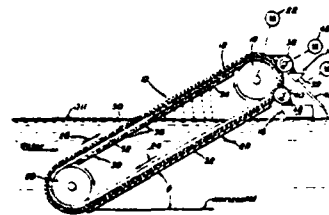
U.S. Cl. 210—23

5 Claims

Oil-contaminated water is purified using apparatus having a revolving polyurethane foam belt which is mounted on an incline relative to the horizontal. The contaminated water moves past and through the revolving belt or the belt is mounted on a boat which moves the belt through the water. In either case, as the belt and water move relative to each other, the oil-contaminated water filters through the belt and is purified. The belt is then squeezed twice. First gently to remove water, and then vigorously to remove oil. The belt may include inner and outer abutting sections which are reinforced by a network of threads. The outer section which first contacts the contaminated water has a larger pore structure than the inner section.

Keywords: Pollutant absorption; Pollutant, mechanical removal

U.S. Cl. X.R. 210-30; 210-40; 210-400;
210-DIG.21



3,617,556

ERADICATING OIL SLICKS

Edward L. Cole, Fishkill, and Howard V. Hess, Glenham,
both of N.Y., assignors to Texaco Inc., New York, N.Y.

Filed Dec. 20, 1968, Ser. No. 785,566
Int. Cl. E02b 15/04; B01d 33/12

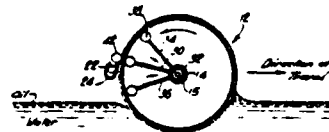
U.S. Cl. 210—30

3 Claims

Separation and recovery of oil from oil slicks on the surface of water by continuously and selectively picking up the surface oil in a relatively thick blanket of a bulk fabric composed of highly oleophilic fibers expressing the oil from the blanket and leaving the fibers in an open condition highly receptive to additional oil.

Keywords: Pollutant absorption; Pollutant, mechanical removal

U.S. Cl. X.R. 210-40; 210-242; 210-402;
210-523; 210-DIG.21



3,617,564
REMOVING OIL OR OIL SUBSTANCE FROM WATER
AND LAND AREAS USING CORNCOB COMPONENTS
 John Vander Hooven, and David I. B. Vander Hooven, both of
 Maumee, Ohio, assignors to Anderson Cob Mills Incorporated,
 Maumee, Ohio

Filed June 1, 1970, Ser. No. 42,444

Int. Cl. B01D 15/00

U.S. Cl. 210-40

5 Claims

Low-density corncob meal is placed on a polluting oil deposit in a body of water or on a land area. The corncob components absorb the oil and the contaminated corncob meal is then removed from the body of water or from the land area.

Keywords: Pollutant absorption

U.S. Cl. X.R. 210-DIG.21

No Figure

3,617,565
METHOD AND MEANS FOR THE ABSORPTION OF
PETROLEUM PRODUCTS
 Hans Erik Fahlvik, Rudsjostrand 5F, 802 40 Gavle, Sweden
 Filed May 24, 1968, Ser. No. 731,799
 Claims priority, application Sweden, May 26, 1967, 7,463,67
 Int. Cl. E02b 15/04

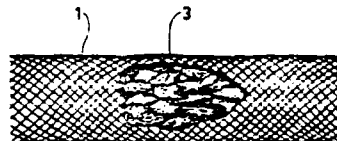
U.S. Cl. 210-40

11 Claims

The absorption of petroleum products is attained by bringing bark from trees belonging to the order Coniferae into contact with the petroleum products. The absorption facilitates the collection and removal of the products from a substrate such as a water surface or a solid base.

Keywords: Pollutant absorption; Pollutant, surface barrier

U.S. Cl. X.R. 210-484; 210-500; 210-DIG.21



3,617,566
METHOD AND MATERIAL FOR SEPARATING OIL
FROM OIL-CONTAINING WATER
 Katsutoshi Oshima, Tokyo; Jiro Kajiyama, Tokyo; Shin Fukumoto, Tokyo, and Nobuo Nagao, deceased, late of
 Yokohama-shi, all of Japan (by Aiko Nagao, legal representative), assignors to Osman Kogyo Kabushiki Kaisha,
 Tokyo, Japan

Filed Nov. 4, 1968, Ser. No. 773,058

Claims priority, application Japan, Nov. 6, 1967, 42/70928

Int. Cl. E02b 75/04

U.S. Cl. 210-40

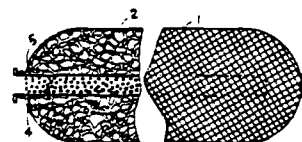
13 Claims

Oil is separated from oil-containing water by contacting the oil-containing water with an adsorbing material consisting mainly of atactic, noncrystalline polypropylene having a molecular weight of 10,000 to 100,000.

Straw, wood wool, or natural fibers can be used as a carrier for the atactic-noncrystalline polypropylene.

Keywords: Pollutant absorption; Pollutant, surface barrier

U.S. Cl. X.R. 210-242; 210-282; 210-484; 210-DIG.21



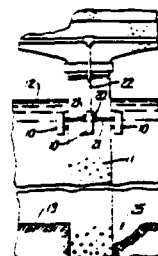
3,617,996
SCOUR DETECTION AT BRIDGE PIERS AND THE LIKE
 Frederick George Herbert, Oakton, Va., assignor to Data-Design Laboratories, Cucamonga, Calif.
 Filed Nov. 24, 1969, Ser. No. 879,301
 Int. Cl. G01s 9/68

U.S. Cl. 340-3 R

3 Claims

Apparatus for measuring bottom scour at structures in the water, such as bridge piers, abutments, retaining walls, dams, locks, drilling rigs, lighthouses and radar platforms. A plurality of electroacoustical transducers on the structure at spaced locations and directed toward the bottom, with means for periodically energizing a transducer at each location and means for determining transit times to the bottom and return. The transit times can be viewed, recorded and compared, with differences in transit times providing a measure of scour at the bottom.

Keywords: Seabed scour protection; Sedimentation measurement; Sonar, depth sounder



NOVEMBER 9, 1971

3,618,236
APPARATUS FOR DIGGING AN
UNDERWATER TRENCH

James D. Piquin, 1700 Destrehan Ave.,
Harvey, La. 70058

Filed May 19, 1969, Ser. No. 827,481
Int. Cl. E02f 3/88

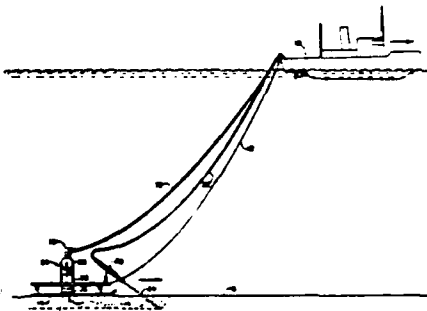
U.S. Cl. 37-43

5 Claims

The combination of a towing ship and a towed underwater trench digging apparatus, and a suction and discharge mechanism mounted on said towed digging apparatus for sucking up and discharging the debris of digging to one side of a trench as it is dug, and the method of removal of digging debris in underwater trench digging with approximately little or no discharge conduit for any depth of water.

Keywords: Seabed trencher

U.S. Cl. X.R. 37-65



3,618,327
CAISSON STRUCTURE AND PIER CONSTRUCTION
METHODS

Joseph P. Frein and Thomas Kinter, Boise, Idaho,
assignors to Morrison-Knudsen Company
Filed Nov. 15, 1968, Ser. No. 776,222

Int. Cl. E02d 5/00, 5/20, 23/00

U.S. Cl. 61-46

29 Claims

Methods for over-water construction of bridge piers, and the like, especially adapted for use at deep-water, shallow-overburden sites utilizing a unitary full-depth caisson which is prefabricated off site. Floatation and ballast chambers in the caisson facilitate movement to location, accurate placement on site, and initial sinking. A plurality of full-depth caissons are interlocked longitudinally during on-site assembly to produced a pier of desired cross-sectional configuration. Lengths of individual caissons are selected to conform to subterranean support topography. A weight distribution block is cast-anchored to the caissons.

Keywords: Offshore caisson; Offshore construction

U.S. Cl. X.R. 61-34; 61-46.5; 61-82



3,618,328
BEARING SUPPORT FOR PILING
 Takeo Nojima, Chiba-ken, Japan, assignor to
 Jupiter Corporation, Seattle, Wash.
 Filed Jan. 5, 1970, Ser. No. 559
 Int. Cl. E02d 5/54

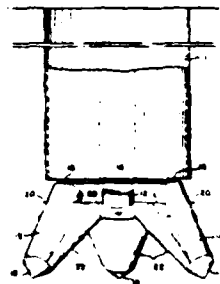
U.S. Cl. 61—53.68

9 Claims

A piling support for the lower end of pilings includes a plurality of tubular leg portions pivoted at their upper ends to the lower end of the piling and positioned equidistantly around the lower end of the piling, the legs having compacting means associated therewith, and means for (1) locking the legs together while the pile is being driven in the ground the desired distance and for (2) unlocking the legs, thereby allowing the legs to spread as the piling is further driven into the ground. The compacting means are half-conical sections attached to each of the legs and extending substantially the length thereof, the outer peripheral surfaces of the conical sections facing inwardly and sloping outwardly relative to the vertical axes of the legs moving from the lower ends of the legs upwardly.

Keywords: Pile footing; Pile-driving shoe

U.S. Cl. X.R. 52-162



3,618,768
LIQUID SWEEPING SYSTEM EMPLOYING HELICAL CONVEYOR METHOD AND APPARATUS
 Kenard D. Brown, 1227 South Willow St., Casper, Wyo.
 Continuation-in-part of application Ser. No. 806,054, Mar. 18, 1969, now abandoned. This application May 8, 1970, Ser. No. 35,660
 Int. Cl. B01d 21/06

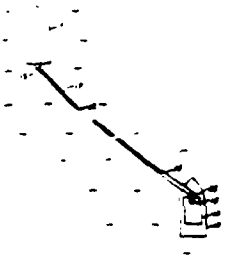
U.S. Cl. 210—83

29 Claims

A method and system for removing light fluid such as oil from heavy fluids such as water comprises an extended length of open screw conveyor constructed of material such that it will float on water. The conveyor may comprise a helical fin having a central bead or core about which stranded cables are wound, the stranded cables may be of steel wire or plastic and when the conveyor is required to float on water, plastic materials are employed for all parts of the conveyor. The conveyor is connected to two spaced motor vessels one end being pivotally connected to one of the vessels for free rotation and the other end passing up into the other vessel through a surrounding conduit and being rotated by a motor mounted on the other vessel. A reservoir is provided in the other vessel to collect the liquid. During operation the cable is rotated in a direction to draw the liquid toward the reservoir vessel and the two vessels are moved forward to sweep an area covered with oil or other lighter fluid. In another embodiment the flexible helical drive member is housed in a flexible tubing having a longitudinal opening for admitting the lighter liquid from the surface of the body of heavy liquid, the entire assembly thus formed floats on the body of liquid.

Keywords: Pollutant, mechanical removal

U.S. Cl. 7.R. 210-242; 210-DIG.21



NOVEMBER 16, 1971

3,620,026

PILE DRIVING METHOD AND APPARATUS

J. T. Mallard, 10203 Chadwick, Houston, Tex. 77029

Filed Nov. 17, 1969, Ser. No. 877,362

Int. Cl. E02d 7/18, 7/20

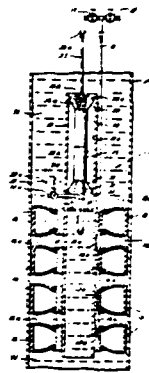
U.S. Cl. 61-46.5

5 Claims

A pile driving method and apparatus wherein a baffle is provided in a pipe or other hollow pile, and a pressure differential is created across the baffle to move or vibrate the pile for either driving the pile into the ground or removing it from the ground.

Keywords: Pile driver, vibratory; Pile extractor

U.S. Cl. X.R. 61-53.5; 61-53.72; 294-93



3,620,027

DOCK STRUCTURE

Edwin A. Nordell, Lyndhurst, Ohio, assignor to The

Metal Craft Company, Chardon, Ohio

Filed Apr. 15, 1968, Ser. No. 721,386

Int. Cl. E02b 3/06; E04b 5/02; B63b 35/58

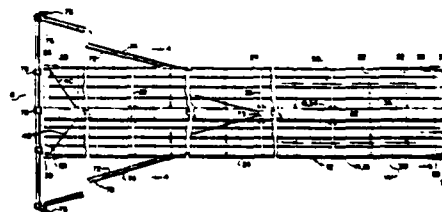
U.S. Cl. 61-48

7 Claims

A dock structure wherein a dock member, forming a component of a dock, has a deck portion formed of interlocking thin members rigidly connected together, is constructed to resist distortion and torsional twist, and is adapted to be anchored either rigidly at one end to shore or so as to rise and fall with the water level floating it.

Keywords: Pier, fixed; Pier, floating; Small-craft pier

U.S. Cl. X.R. 52-493; 52-494; 52-627; 114-.5



NOVEMBER 23, 1971

3,621,593
**SELF-REGULATING SYSTEM FOR TRANSMISSION
OF SOLIDS IN A FLUID MEDIUM**
James R. Hickey, 3324 Carpenter Road,
Titusville, Fla. 32780

Continuation of application Ser. No. 675,386, Oct. 16,
1967. This application Jan. 13, 1970, Ser. No. 1,989
Int. Cl. E02f 3/88

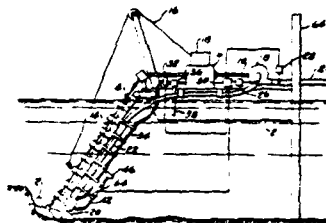
U.S. Cl. 37-57

11 Claims

A device for automatically regulating the solids to liquid ratio in a dredging system and the like, utilizing pressure sensors to detect pressure variations caused by clogging or mass ratio changes in the system. The pressure sensors in turn control a valve or valves which meter clear fluid to the intake of the dredging system, in an amount to unplug the intake and/or lower the solids to liquid ratio to a safe level.

Keywords: Dredge, cutterhead; Dredge intake

U.S. Cl. X.R. 37-63; 37-67; 37-195; 137-4;
137-7; 137-92; 137-467.5; 302-14



3,621,662
**UNDERWATER STORAGE STRUCTURE AND
METHOD OF INSTALLATION**
Lawrence A. Starr and Joseph W. Roberts, Houston, Tex.,
assignors to Brown & Root, Inc., Houston, Tex.
Filed Sept. 29, 1969, Ser. No. 861,560
Int. Cl. B63b 35/44; E02b 17/00

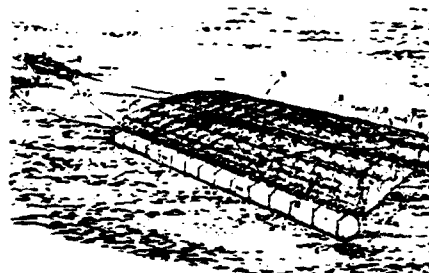
U.S. Cl. 61-46.5

16 Claims

An underwater storage structure, for fluids such as oil which are immiscible with and of lesser specific gravity than water, is capable of being towed to a site and submersed to the floor of the body of water. The storage structure is made of concrete and has a truncated pyramidal shape with the interior of its lower portion in communication with the body of water. A tender frame having tanks for buoyancy and ballasting may be used to install the storage structure on the floor of the body of water. The installation procedure includes positioning the tender frame over the storage structure, tying the tender frame to the storage structure, flooding the storage structure, and ballasting the tender frame to achieve negative buoyancy and to position the storage structure on the floor of the body of water.

Keywords: Offshore construction; Offshore storage tank, submerged

U.S. Cl. X.R. 114-0.5T; 220-1B



3,621,663

RIBBED PILE

Akemasa Otani, 4, 2-chome Asakusa Hashiba-cho,
Daito-ku, Tokyo, Japan
Filed Mar. 13, 1969, Ser. No. 806,918
Int. Cl. E02d 5/28

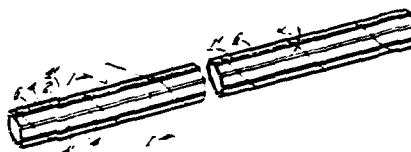
U.S. Cl. 61—53

4 Claims

This low-cost, light-weight, high-strength, hollow cylindrical pile having longitudinal ribs is manufactured by rolling an elongated metal plate of predetermined width so as to produce spaced ridges thereon extending at a predetermined angle between lateral edges. The ridged metal plate is spirally wound so that the ridges register to produce longitudinally-extending ribs and the juxtaposed lateral edges are joined, preferably by welding, to form a continuous spiraled joint. When driven into a penetrable medium, the ribs provide directional control and means for joining adjacent piles into a unitary structure.

Keywords: Pile, steel

U.S. Cl. X.R. 29-477.3; 52-738; 138-134



3,621,805

EMBEDMENT ANCHOR

Jasper E. Smith, Ventura, Calif., assignor to the United States of America as represented by the Secretary of the Navy

Filed Feb. 2, 1970, Ser. No. 7,725
Int. Cl. B63b 21/40

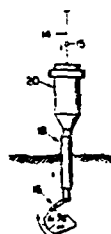
U.S. Cl. 114—208 R

4 Claims

An anchor of the embedment type having an elongate staff and an articulated soil penetrating tip bearing radially arranged flukes. During soil penetration, the flukes are disposed edgewise to insure minimum resistance to soil penetration. After full penetration a short upward pull on the staff rotates the articulated tip to a position with the flukes disposed cross-wise to gain maximum purchase on the soil. It may be embedded either by free fall impact or by vibration.

Keywords: Embedment anchor

U.S. Cl. X.R. 52-164



3,622,970

METHOD OF SEISMIC PROSPECTING

Leon Seyous, Pau, and Maurice Barbier, Ousse, both of France, assignors to Societe Anonyme dite Societe National des Petroles D'Aquitaine, Courbevoie, France

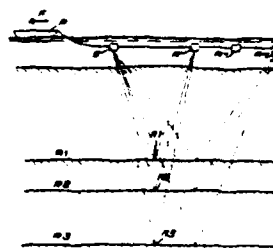
Filed June 19, 1969, Ser. No. 834,814
Claims priority, application France, June 21, 1968, 155964
Int. Cl. G01v 1/28

U.S. Cl. 340—15.5 AC

3 Claims

A method of seismic prospecting comprises transmitting into the ground a signal containing a series of discrete energy impulses of the same sign and constant amplitude in which the number of and intervals of time between the pulses are such that when the received signals are intercorrelated with a function of the transmitted signal to determine the travel time of the reflected waves the intercorrelation function of the transmitter signal has correlation residues, the amplitudes of which are less than a given fraction of the maximum amplitude of said intercorrelation function.

Keywords: Seismic survey method



NOVEMBER 30, 1971

3,623,362

FREE-FALL CURRENT METER

Robert Daniel Gerard, Palisades, N.Y., assignor to the United States of America as represented by the Secretary of the Navy

Filed Feb. 11, 1970, Ser. No. 10,328

Int. Cl. G01c 23/00; G01p 5/08

U.S. Cl. 73—189

9 Claims

A current measuring device for the continuous recording of current during the free fall and rise of an instrument is provided. The instrument contains recording and direction indicating equipment in its central portion, fins at its tail end to impart rotation and remotely positioned pressure probes at the ballasted nose end for sensing pressure differences indicative of the current encountered on both descent and ascent.

Keywords: Current measurement; Instrument deployment



3,623,369

WATER-SAMPLING DEVICE

Ragnar E. Kjellberg, Kroksta, Sweden, assignor to Johan Eric Johansson, Storvik, Sweden

Filed Aug. 27, 1969, Ser. No. 853,394

Claims priority, application Sweden, Sept. 2, 1968, 11,780/68

Int. Cl. G01k 13/12; G01n 1/10

U.S. Cl. 73—354

5 Claims

A water sampling device, including a vessel capable of being closed and opened by means of a remote controlled valve and adapted to be lowered into lakes, rivers etc. for the purpose of collecting samples of water. The device includes a vessel capable of being opened and closed by a remote controlled valve means, a thermometer for measuring the temperature of the water, and a line for lowering the vessel down to the desired depth. It has a single actuating pump, the piston of which can be retained in the position taken after an evacuation stroke. A closing valve cooperates with the evacuation chamber, and the movable valve means has an attachment for the line which can be opened by pulling said line.

Keywords: Sampler, water

U.S. Cl. X.R. 73-425.6



3,623,609

SKIMMER FOR SEPARATING FLOWING LIQUIDS FROM WATER

John A. Ainlay, 3330 Grant St., Evanston, Ill.

Filed Dec. 2, 1969, Ser. No. 881,396

Int. Cl. C02b 9/02

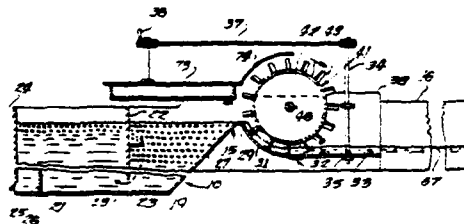
U.S. Cl. 210—242

17 Claims

ABSTRACT: A floating, seagoing skimmer has a separating chamber communicating at its lower end with the body of water into which it is placed, a weir at the front of the chamber having a forwardly extending curved surface which terminates in a skimming edge and a rotating vaned impeller whose path of movement is disposed relatively closely to the curved surface of the weir so as to carry the combined floating liquid and water over the weir and into the separating chamber. The top of the weir is substantially above the water surface so as to create a hydrostatic head for causing waterflow out of the bottom of the chamber and the number of vanes in the impeller, its speed of rotation and its depth of penetration are such as to move the combined floating liquid and water with a minimum of turbulence. The skimming edge ahead of the weir is adapted to be held somewhat below the interface of the floating liquid and water surface

Keywords: Pollutant, mechanical removal; Pollutant removal watercraft

U.S. Cl. X.R. 210-DIG.21



3,624,596
ULTRASONIC RANGE-ATTENUABLE DEPTH-
MEASURING SYSTEM

Harry R. Dickenson, East Elmhurst, and George S. Hamilton,
St. Albans, both of N.Y., assignors to Sona Labs, Inc.,
Brooklyn, N.Y.

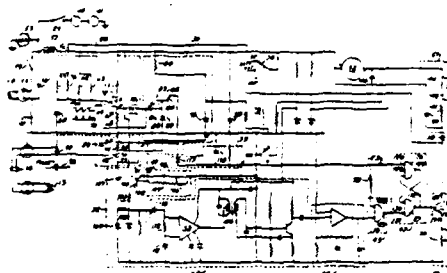
Filed Mar. 10, 1970, Ser. No. 18,087
Int. Cl. G01s 9/68

U.S. Cl. 340-3 R

7 Claims

An ultrasonic depth-measuring system wherein a highly accurate pulse-generating timing circuit having voltage compensation provides a keying signal for Hartley-type oscillator whose output is applied to an underwater transducer. A portion of the transmitter output is also applied to the receiver, lockout circuit, and to a variable-range attenuator which effectively attenuates the receiver input inversely proportional to the range squared. The receiver output is amplified and detected and applied to one input of a NOR gate. The lockout circuit detects the transmitter output and provides a lockout logic signal to the NOR gate and the flip-flop connected to the NOR gate output to reset the flip-flop. The output of the lockout is an RC discharge which blocks the receiver output until the discharge voltage has decreased below a predetermined value. The flip-flop in turn controls the time duration of a current generator (e.g., from transmit pulse to received echo) whose current is integrated and applied to the meter for indication of depth.

Keywords: Sonar, depth sounder



DECEMBER 7, 1971

3,624,933
DREDGING PLANT APPARATUS COMBINING
PUMPING AND DIGGING ACTION

Giovanni Faldi, Via Por S. Maria 4,
Florence, Italy

Filed June 12, 1969, Ser. No. 832,788

Claims priority, application Italy, June 17, 1968,
17,828/68

Int. Cl. E02f 3/92

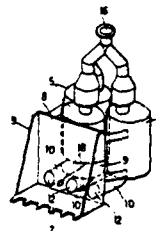
U.S. Cl. 37-63

4 Claims

Dredging plant apparatus in which the conventional pump body is integral with a digging shovel of an excavator. The device which is operative by thrusting or dragging action utilizes a shovel with a plurality of pump bodies opening in the rear of the shovel and with blowing nozzles also mounted thereon and with pump and nozzle openings directed in the direction of operation of the shovel.

Keywords: Dredge, suction; Dredge intake;
Pump

U.S. Cl. X.R. 37-71; 37-72



3,625,012

SELF-LOCKING PILE JOINT

Samuel Thorburn, Glasgow, Scotland, assignor to
Logistics Limited, Great Britain
Filed Nov. 19, 1969, Ser. No. 878,056

Claims priority, application England, Feb. 4, 1969,
6,059/69; May 22, 1969, 26,064/69
Int. Cl. E02b 5/30; E04b 1/48

U.S. Cl. 61—56

12 Claims

Two piles are joined together by interfitting means in their opposed ends. One pile has a tube embedded therein, the tube having one, open, end flush with the end face of the pile and its other end being flared and closed. The other pile has a rod whose end is cut projecting from it. The rod is placed in the tube and as the pile is driven the cut end is forced by a wedge into the flare of the tube, thus locking the piles together.

Keywords: File, concrete; File section connection

U.S. Cl. X.R. 287-124; 287-127



3,625,013

EXPANSIBLE MANDRELS FOR USE IN DRIVING OR WITHDRAWING TUBULAR PILES

Charles L. Guild, 7 Stone Tower Lane, Barrington, R.I. 02806, and Willard B. Goodman, P.O. Box 62, Newport, Oreg. 97365

Filed June 16, 1970, Ser. No. 46,641
Int. Cl. E02d 7/30

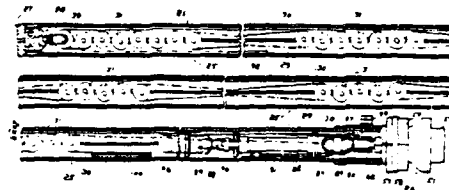
U.S. Cl. 61—53.72

11 Claims

Expansible mandrels are disclosed for use in driving or withdrawing tubular piles. The mandrels comprise sections interconnected by cables in a manner such that a pull on one cable expands the mandrel so that it will tightly grip the pile into which it has been inserted and a pull on the other cable draws the sections together so that the mandrel may be inserted in or withdrawn from the pile. In one embodiment, a single acting ram housed within the mandrel controls the expansion cable while in another embodiment of the invention, a double acting ram is used so that both cables can be actuated thereby.

Keywords: File driver, impact; File extractor

U.S. Cl. X.R. 242-72



3,625,014

METHOD AND APPARATUS FOR UNDERWATER DEPOSITION OF SETTABLE MATERIALS

Henrikus Frederikus Josephus Marie Hillen, Laan van Meerdervoort, Netherlands, assignor to Prepaht N.V., Gouda, Netherlands

Filed June 11, 1969, Ser. No. 832,275

Claims priority, application Netherlands, June 13, 1968,
6808349

Int. Cl. E02b 3/12, 5/02

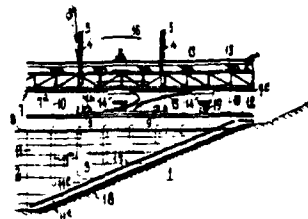
U.S. Cl. 61—72.4

14 Claims

A method and apparatus for the underwater deposition of settable materials, such as (concrete) mortar, asphalt and the like. Use is made of a pouring bag or envelope of flexible material, which is moved along with its lower end sliding on the underwater surface to be treated and tends to be constantly flattened by the static pressure of the surrounding water, so that the bag or envelope walls will continuously contract around the material flowing therethrough from a location above water level and consequently braking the free fall of the material. As a result of this the material will leave the lower outlet slot as a slowly outflowing uniform web and the danger of demixing of the outflowing material by the action of the surrounding water is reduced to a minimum.

Keywords: Asphalt, Concrete form; Seabed material placement; Slope protection

U.S. Cl. X.R. 61-7; 61-63



3,625,066
WATER SAMPLING APPARATUS
 Michael L. Greene, Hillcrest Heights, Md., assignor to
 the United States of America as represented by the
 Secretary of the Navy
 Filed Mar. 30, 1970, Ser. No. 23,641
 Int. Cl. G01n 1/10
 U.S. Cl. 73—425.4 R 5 Claims

Keywords: Sampler, water

Water sampling apparatus includes a standard Nansen bottle to which is clamped a mounting block which swivelingly supports a support bar, transversely bored to guide a slide rod. A slide rod, slidably disposed in the bore of the support bar, is attached to the upper valve lever of the Nansen bottle. A connecting rod conventionally connects the upper and lower valve levers so that the valves close together. The slide rod is urged downward by several elastic bands, but is prevented from downward movement by a pivoted latch which engages a pin projecting from the slide rod. The latch is, in turn, urged to unlatching position by its own elastic bands, but is restrained in latching position by a low wattage resistor. When the apparatus has been lowered to the proper depth in the sea, a high voltage can be delivered to the resistor through appropriate circuitry to break the resistor and permit the latch to move under the influence of its elastic bands out of latching position and release the slide rod to move downward under the influence of its elastic bands. Downward movement of the slide rod closes both top and bottom valves of the Nansen bottle, and the water sample is trapped.



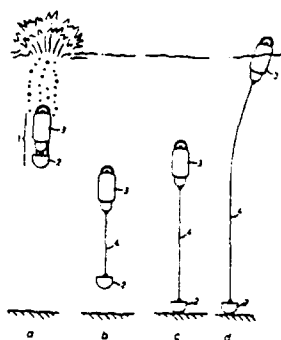
DECEMBER 21, 1971

3,628,205
OCEANOGRAPHIC SURVEY DEVICE
 Bertrand Julian Starkey, and Alexander Smith Watson, both
 of Dartmouth, Nova Scotia, Canada, assignors to EMI
 Limited, Hayes, Middlesex, England
 Filed Dec. 12, 1968, Ser. No. 783,382
 Claims priority, application Great Britain, Jan. 31, 1968,
 4,906/68
 Int. Cl. B63b 21/16
 U.S. Cl. 9—8 R 6 Claims

Keywords: Buoy, instrumented; Buoy mooring
 system; Instrument deployment;
 instrument retrieval

U.S. Cl. X.R. 340-2

An oceanographic survey device according to the invention comprises a buoy, means for mooring the buoy at a predetermined depth to the ocean bed, instruments attached to the buoy for one or more recorders carried by the buoy for measuring one or more parameters, means for causing the buoy to move up and down in the water along a substantially vertical line, and clock means for sequentially initiating operation of the means for causing the buoy to move at regular predetermined times after the buoy is moored. Means are provided for controlling the operation of the means for causing the buoy to move so that in response to each initiation of the operation thereof the buoy moves vertically in the water from the predetermined depth to a second depth and back to the predetermined depth.



3,628,263

PRESSURE DIFFERENTIAL MEASURING MEANS FOR SUCTION DREDGING INSTRUMENTS

Romke van der Veen, Jutphaas, Netherlands, assignor to N. V. Ingenieursbureau Voor Systemen en Octrooien "Spanstaal", Rotterdam, Netherlands

Filed July 2, 1969, Ser. No. 838,712

Claims priority, application Netherlands, July 15, 1968, 68.09986

Int. Cl. E02f 3/88

U.S. Cl. 37-58

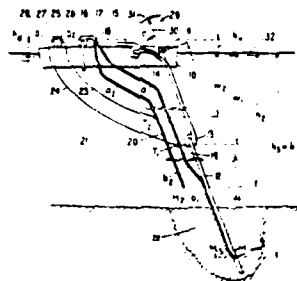
4 Claims

A pressure differential measuring device is located on board a dredging vessel. The water-filled lines transmitting to the measuring device communicate with branches of a purgative water system at points located sufficiently higher than the discharge points of the branches that the pressures at such communication points never falls below the value of the vapor pressure of the water, thus allowing the onboard placement of the measuring device.

Also, the communicating points are so located that the ratio of the branch flow pressure loss in one branch at its communicating point with respect to the branch flow pressure loss at its discharge point is equal to the ratio of these values in the other branch. In this way, the measured pressure differential is independent of the purgative pump output.

Keywords: Dredge, suction; Dredge-spoil transport

U.S. Cl. X.R. 73-407R; 73-438; 137-92; 417-19



3,628,333

FLOATING CONTAMINANT CONSTRAINING FENCE

Eugene W. Newton, 5804 Berkeley Ave., Baltimore, Md.

Filed June 26, 1970, Ser. No. 50,170

Int. Cl. E02b 15/04; C02c 1/38

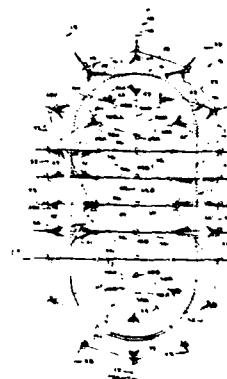
U.S. Cl. 61-1

23 Claims

A floating contaminant constraining fence structure wherein the fence is assembled from a plurality of modular fence sections to enclose at least part of a selected water surface area. Each of the fence sections including vertically elongated strut members having buoyant devices to support them at a selected level in the water. Stringers connecting the tops and bottoms of the strut members and plural sets of harness ropes for supporting the modular fence sections in a desired arrangement, together with a cloth web extending above and below the water level supported by the stringers. The method of laying out such a floating fence structure, and settling tank structure usable therewith are also disclosed.

Keywords: Pollutant collection; Pollutant, surface barrier

U.S. Cl. X.R. 61-5; 114-230; 210-242



3,628,334

FLOATING BREAKWATER

Arthur J. Coleman, 1841 N.E. 42nd St., Pompano Beach, Fla.
Filed July 31, 1969, Ser. No. 846,372

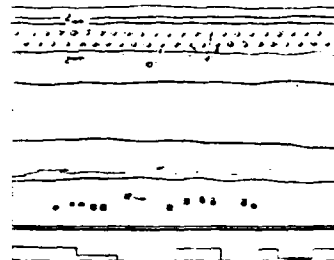
Int. Cl. E02b 3/06

U.S. Cl. 61-5

8 Claims

A series of hollow rigid spherical floats anchored in an offshore grouping so as to act in the manner of a breakwater for breaking up and smoothing wave action. Each of the floats is anchored to the bottom by a flexible cable and, through internal ballast, rides partially submerged in the water.

Keywords: Breakwater, floating; Buoy mooring system; Embedment anchor



3,628,337

ANCHORABLE PILE

Fred C. Stepanich, c/o CDM P.O. Box 2-55, Bangkok, Thailand, and Thomas L. Adams, C. M. Upham Int'l, c/o OTCC/Thailand, APO San Francisco, Calif.

Filed Sept. 26, 1969, Ser. No. 861,368

Int. Cl. E02d 5/54, 5/80

U.S. Cl. 61-53.68

10 Claims

A piling consisting of a main, elongated pile member which has within its body, a plurality of retracted anchors which after the pile is inserted into the ground, are capable of being independently moved laterally of the piling member to provide anchors for the piling member without movement of the piling member.

Keywords: Embedment anchor; Pile footing

U.S. Cl. X.R. 52-161; 254-41



3,628,665

FLOATING OIL CONTAINMENT APPARATUS

Lubertus Bakker, Wellsville, N.Y., assignor to The Air Pre-heater Company Inc., Wellsville, N.Y.

Filed Feb. 24, 1970, Ser. No. 13,637

Int. Cl. E02b 15/04

U.S. Cl. 210-242

1 Claim

Apparatus for restraining an oil slick floating freely on the surface of a body of water whereby it is at all times under control and not free to spread with movement of water to contaminate the surrounding areas. The oil slick controlling apparatus contains oil-water separation means whereby oil may be removed from the oil slick for further utilization.

Keywords: Pollutant, suction removal; Pollutant, surface barrier

U.S. Cl. X.R. 210-DIG.21

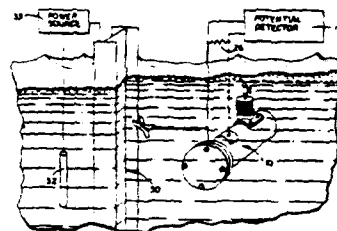


3,629,090
**APPARATUS FOR MEASURING HYDROGEN
 ABSORPTION**
 Edward L. Ghorrmley, Woodland Hills, Calif., assignor to
 North American Rockwell Corporation
 Filed Sept. 9, 1968, Ser. No. 758,538
 Int. Cl. G01n 27/46
 U.S. Cl. 204—195 4 Claims

The apparatus of the invention is designed to measure the amount of hydrogen that is absorbed by a metal structure. The apparatus is comprised of a receptacle having a wall section which is made of metal similar to the metal of the structure under observation. The receptacle is filled with a neutral or caustic solution. A cathode which may be a rod of lead oxide is inserted into the caustic solution. The wall section, also in contact with the solution, operates an anode in the caustic solution. Means are provided for measuring the electrical potential between the anode and the cathode, which potential will be a function of the amount of hydrogen absorbed through the anode into the solution.

Keywords: Corrosion measurement

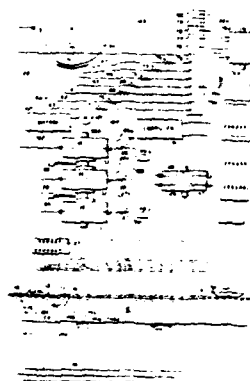
U.S. Cl. X.R. 204-11



3,629,800
**GAPPED DECONVOLUTION REVERBERATION
 REMOVAL**
 William A. Schneider, Dallas, Tex., assignor to Texas Instru-
 ments Incorporated, Dallas, Tex.
 Continuation of application Ser. No. 559,811, June 23, 1966.
 This application Sept. 18, 1969, Ser. No. 859,002
 Int. Cl. G01v 1/36, 1/28
 U.S. Cl. 340—15.5 12 Claims

Disclosed is a method of suppressing reverberatory energy in a seismic trace by subtracting from said trace a trace synthesized by time domain filtering said seismic trace, delayed by time, T , approximately equal to the two-way travel time of seismic energy in the reverberating medium, said filter parameters being defined by the matrix equation $Y_{m+1}(X) = Z Y_m(X)$ where Z is the crosscorrelation coefficient function of a portion of the seismic trace within a truncated data gate and characterized by the reverberation energy, and a similar portion of the seismic trace delayed by a time T , X is the autocorrelation coefficient function of that portion of the trace and Y_m is the function designing filter weights.

Keywords: Seismic record processor



3,629,801
**SEISMIC EXPLORATION IN THE VICINITY OF A
 SHORE AREA**
 Erwin C. Brede, Metairie, La., assignor to Texas Instruments
 Incorporated, Dallas, Tex.
 Filed Aug. 28, 1969, Ser. No. 853,645
 Int. Cl. G01v 1/16, 1/28
 U.S. Cl. 340—15.5 18 Claims

First electrical signals are generated in response to detection in shallow water adjacent a shore area of variations in pressure created by the generation of seismic waves. Second electrical signals are generated at the shore area in response to particle velocity variations created by the seismic waves. The first and second electrical signals are recorded and then phase shifted with respect to one another according to a predetermined optimum time shift function determined by cross-correlation of test signals.

Keywords: Seismic hydrophone array; Seismic record processor; Seismic survey method



3,629,813

METHOD AND APPARATUS FOR ECHO-SOUNDING OF SHORT DISTANCES

Hans Drenckelfort, Kiel-Elmschenhagen, Germany, assignor to Electroacoustic Gesellschaft m.b.H., Kiel, Germany

Filed July 31, 1969, Ser. No. 846,415

Claims priority, application Germany, Aug. 3, 1968, P 17 66 881.4

Int. Cl. G01s 9/68

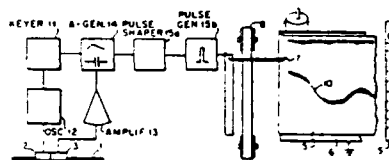
U.S. Cl. 340-3 R

27 Claims

An echo-sounding method and apparatus for measuring short distances, particularly shallow depths, with the aid of a periodically moving indicator member whose indicating action is triggered in dependence upon the time elapsing from the emission moment of the pulse to the reception moment of the echo. For improving the resolution of indication at short distances, the time is expanded by continuously interposing between the echo reception moment and the triggering moment, a delay which increases in proportion to the length of the pulse travel time. For this purpose a triangular wave voltage is generated, the ascending portion of the wave commencing to ascend at the moment of pulse emission and to decline at the moment of echo reception. Concurrently with the triangular wave voltage there is provided an auxiliary voltage, for example of rectangular or trapezoidal wave shape, which has a steep lagging flank coincident with the end of the triangular wave. A trigger pulse derived from the steep lagging flank controls the action of the moving indicator member. Preferably the triangular wave voltage is obtained by supplying a constant current charge to a capacitor commencing with the moment of pulse emission, and changing from charging to constant current discharging of the capacitor under control by the arrival of the echo.

Keywords: Sonar, depth sounder

U.S. Cl. X.R. 340-3C; 343-13R



DECEMBER 28, 1971

3,629,958

INTERNAL AND SURFACE WAVE SIMULATOR TANK

Jack R. Olson, San Diego, and Henry M. Miller, Jr., Lakeside, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy

Filed Mar. 6, 1969, Ser. No. 804,866

Int. Cl. G09b 23/12

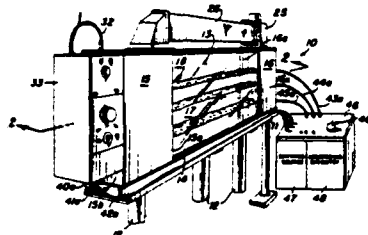
U.S. Cl. 35-19

5 Claims

A rectangularly shaped tank having at least one transparent wall is partially filled with fluids having discrete specific gravities to ensure a stratified separation of the fluids within the tank. A visual observation of this separation is aided by dyeing the fluids different colors. A reciprocating vane or bellows is suspended in the liquid and, via an appropriate driving mechanism, is reciprocated at various frequencies and magnitudes imparting an internal wave motion to the layered fluids to simulate oceanographic internal waves found in the strata of the ocean as determined by volumes of water having distinct salinities, temperatures, or currents, etc. A variable-speed fan disposed in a recirculating-air system impels air onto the exposed upper surface of the fluids simulating wind conditions and their creation of various surface waves. High-frequency sonar or optical beam forming and receiving device transducers are optionally mounted at opposite ends of the tanks in the separate layers to transmit and receive signals through the layers and thus provide, through appropriate monitoring circuitry and devices, an indication of the effects of surface and internal wave action on the signals.

Keywords: Wave flume; Wave generator

U.S. Cl. X.R. 40-106.21; 73-170

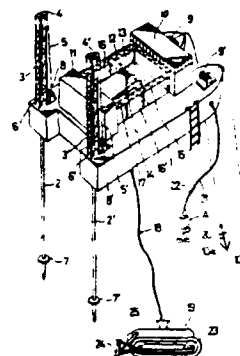


3,629,963
APPARATUS FOR LEVELLING UNDERWATER GROUND
 Yasuo Itami, Tokyo, Japan, assignor to Japan Construction
 and Development Co., Ltd., Tokyo, Japan
 Filed May 19, 1969, Ser. No. 828,091
 Claims priority, application Japan, Dec. 23, 1968, 43/94681
 Int. Cl. E02f 5/00
 U.S. Cl. 37-54 1 Claim

In an apparatus for levelling underwater ground, an underwater bulldozer is suspended from a ship by means of a cable, and a diver is lowered near the bulldozer to remotely manipulate the bulldozer by operating a control panel carried by him. Electric signals from the control panel are supplied to the bulldozer via an electric cable. The ship is provided with a cavity to accommodate the bulldozer, a winch to raise and lower the bulldozer and retractable bulldozer-supporting means.

Keywords: Seabed grader

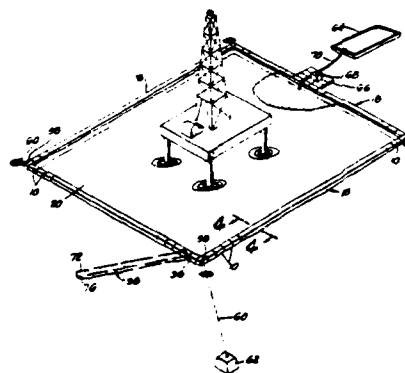
U.S. Cl. X.R. 61-69; 172-801



3,630,033
APPARATUS FOR CONTROLLING OIL SLICKS
 Ralph L. Tuttle, 7135 Hollywood Boulevard, Hollywood,
 Calif., and George T. Lister, 3511 Fernwood Avenue, Los
 Angeles, Calif.
 Filed Apr. 30, 1970, Ser. No. 33,197
 Int. Cl. E02b 15/04
 U.S. Cl. 61-1 F 5 Claims

An apparatus for controlling oil slicks which incorporates a plurality of modular flotation tanks joined together to form a closed structure, with a large gate therein to allow the structure to be positioned around an oil slick and control curtains extending vertically downward from the structure beneath the surface of the water and around the oil slick.

Keywords: Pollutant, surface barrier



3,630,035

**BARRIER WHICH MAY BE USED FOR THE
PROTECTION OF HARBOR INSTALLATIONS**

Roland Charles Wanneroy, Paris, France, assignor to Pneumatiques Caoutchouc Manufacture et Plastiques Kleber
Colombes, Place de Valmy, Colombes, France

Filed Nov. 3, 1969, Ser. No. 873,272

Claims priority, application France, Nov. 13, 1968, 173622

Int. Cl. E02b 3/22

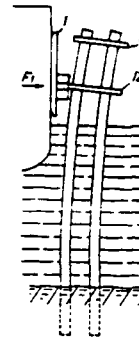
U.S. Cl. 61-46

5 Claims

A barrier, which may be used for the protection of harbor installations, is provided with a tiltable impact member and resilient means is arranged in horizontal and vertical planes in a mounting for the member so that the forces tending to tilt the barrier act in shear on the resilient means.

Keywords: Pier fender; Pile dolphin

U.S. Cl. X.R. 61-48; 114-219



3,630,036

**ELONGATED ELEMENT TO BE DRIVEN INTO THE
GROUND TOGETHER WITH A SHOE**

Abraham Francois Van Weele, Waddinxveen, Netherlands,
assignor to N.V. tot Aanneming van Werken voorheen H.J.
Nederhorst Turfmarkt, Gouda, Netherlands

Filed Dec. 19, 1969, Ser. No. 886,700

Claims priority, application Netherlands, Dec. 20, 1968.

July 15, 1969; 6818364, 6910827

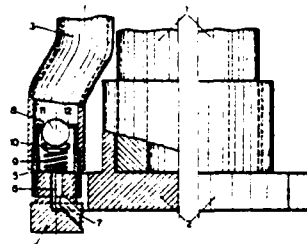
Int. Cl. E02d 7/24

U.S. Cl. 61-53.74

3 Claims

An elongated element, such as a foundation pile or a tube for casting a concrete foundation pile in situ, adapted to be driven in the ground, in particular by vibration, together with a shoe, and comprising at least one supply pipe connected with the outer wall of the element, extending in the longitudinal direction of the same, terminating near the lower end of the element, and connectable at its top, through a supply valve, to a source of a pressure medium, in particular water under pressure. Each supply pipe, respectively, is provided at its lower end with means preventing a penetration of earth into the supply pipe substantially completely when the supply valve is closed, but allowing a discharge of the pressure medium from the supply pipe when the supply valve is open.

Keywords: Concrete form; Pile, concrete;
Pile driver, water jet; Pile-
driving shoe



3,630,161

MULTIPLE PURPOSE FLOATING CONCRETE RING

Hans Christer Georgii, Rindögatan, Stockholm, Sweden, assignor to Aktiebolaget Hydro Betong, Stockholm, Sweden

Filed May 6, 1969, Ser. No. 822,151

Claims priority, application Sweden, May 17, 1968, 6754/68

Int. Cl. B63b 35/02

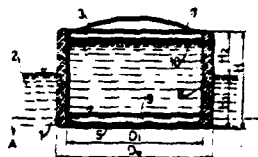
U.S. Cl. 114—0.5 T

8 Claims

A concrete structure usable in water for a large number of various purposes, as for instance for transporting and/or storing liquids having a lower density than that of the water, for protecting a given water surface against wave motions, as a floating or bottom-fixed support foundation for other structures in the water, for mooring other structures floating in the water, etc. includes a cylindrical concrete shell, which is preferably open at both its ends and has a total displacement in the water exceeding its total deadweight and is disposed in the water with its axis of symmetry substantially vertical. The wall structure of the cylindrical concrete shell includes a large number of cells usable as ballast and trim tanks for controlling the attitude and the buoyancy of the concrete shell in the water. The concrete shell or ring can be arranged floating in the water at the water surface or submerged to rest upon the sea bottom with a force determined by the amount of ballast filled into the ballast and trim tanks. When used for transporting and/or storing a liquid having a lower density than that of water, the cargo liquid is disposed in a floating position upon the water in the space enclosed by the cylindrical concrete shell.

Keywords: Offshore platform anchor; Offshore platform, fixed; Offshore storage tank, emergent; Offshore structure fender; Seabed foundation

U.S. Cl. X.R. 61-46.5; 220-9R; 220-15; 220-18



3,630,376

OIL SLICK REMOVING VESSEL

Larry D. Price, 2656 S. Union, Blue Island, Ill.

Filed Nov. 3, 1969, Ser. No. 873,153

Int. Cl. E02b 15/04; B01d 21/24

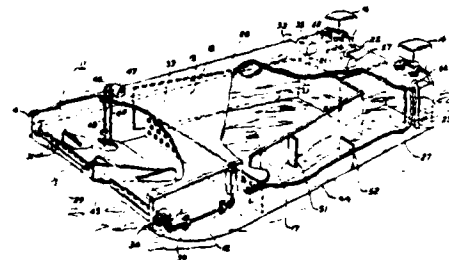
U.S. Cl. 210—242

6 Claims

A vessel is disclosed for removing floating oil and other waste matter from the surface of water, such as from lakes, harbors, rivers or seas. An elongated pipe having a plurality of spaced slits for permitting water to flow therethrough is positioned along the forward portion of the vessel. A pump provides water under pressure to the pipe. Means for adjusting the pitch of the vessel and the depth at which the pipe is positioned are also provided.

Keywords: Pollutant collection; Pollutant removal watercraft; Pollutant, suction removal

U.S. Cl. X.R. 210-540



3,630,891

METHOD OF REMOVING OIL FROM THE SURFACE OF WATER

Kenneth S. Peterson and George R. Palkie, Cloquet, Minn., assignors to Conwed Corporation, St. Paul, Minn.

No Drawing, Filed Feb. 28, 1969, Ser. No. 803,406

Int. Cl. B01d 15/00

U.S. Cl. 210—36

7 Claims

A felt fibrous sheet treated with a water repellent sizing material is used to remove oil floating upon the surface of water by absorbing the oil in preference to the water.

Keywords: Pollutant absorption; Pollutant, mechanical removal

U.S. Cl. X.R. 210-DIG 21

No Figure

2. 1972
3,631,550 to 3,707,232

JANUARY 4, 1972

3,631,550
MOORING DEVICES

Leslie Gerald Bullen, Dartmouth, Nova Scotia, Canada, assignor to EMI Limited, Hayes, England

Filed July 16, 1969, Ser. No. 842,286

Claims priority, application Great Britain, July 16, 1968, 33,731/68

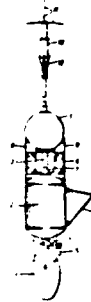
Int. Cl. B63b 21/52

U.S. Cl. 9-8

5 Claims

Keywords: Buoy, instrumented; Buoy mooring system; Instrument deployment

A mooring device is disclosed with a float to be held at a given depth and including a sinker, means linking the float and the sinker together, a cable connecting the float to the sinker and means mounted on the sinker for paying out the cable, means for disabling the paying out means on the impact of the sinker with the sea bed, and means associated with the linking means for releasing the linking means at a preset depth.



3,631,670
DEVICE TO EXTRACT POWER FROM THE
OSCILLATION OF THE SEA

Takis P. Vassilakis, Paris, France, assignor to Treadwell Corporation

Filed Sept. 30, 1969, Ser. No. 862,244

Int. Cl. F03c 5/00

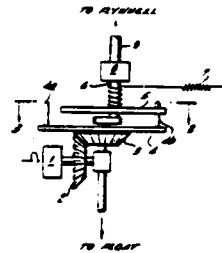
U.S. Cl. 60-22

4 Claims

Keywords: Power, wave

U.S. Cl. X.R. 74-88; 74-126

The device consists of two floats having different natural oscillation frequencies. The floats are linked by a rocking rod. The floats are set into a bobbing motion relative to one another by oscillations on the surface of a body of water. A mechanism is provided for translating the rocking motion of the rocking rod into a rotary motion of a fly wheel. The fly wheel can be utilized to drive a generator.



3,631,679

**APPARATUS TO CONFINE AND RECOVER OIL
SPILLAGE AT SEA**

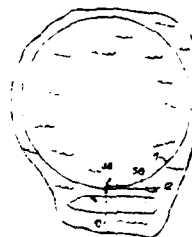
Paul Fisch, 171 East 77th St., New York, N.Y.
Filed July 24, 1969, Ser. No. 844,301
Int. Cl. E02b 15/04

U.S. Cl. 61-1 F

14 Claims

The apparatus is a floating loop barrier which can be looped to surround a large water area covered with oil. The loop can be reduced so that the originally thin oil film which cannot escape, will gain more height so that it can be pumped out, separated from the water. The barrier is reduced by having one end passed through an eye at the other end and pulled by a boat. The barrier comprises a flexible steel cable or rope core surrounded by inflated sleeve sections attached in tandem. The barrier can be reeled onto a ship and the inflated sections separated from the rope. The sleeves are deflated and stored on the ship while the rope is wound on a drum for storage on the ship.

Keywords: Pollutant collection; Pollutant, surface barrier



3,631,827

HOPPER BARGE

Bartele Van der Werff, Capelle A/D IJssel, Netherlands, assignor to A. Vuyk & Zonen's Scheepswerven N.V., IJssel, Netherlands

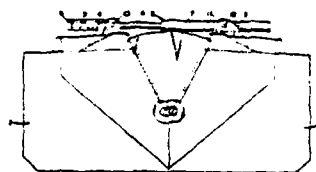
Filed Jan. 2, 1970, Ser. No. 335
Int. Cl. B63b 35/30

U.S. Cl. 114-29

1 Claim

A hopper barge comprises two longitudinal buoyancy chambers hinged together beneath the deck and defining over a part of their lengths a passageway interposed therebetween, which chambers can be adjusted relative to each other by means of at least one hydraulic cylinder located above the deck and hingedly connected thereto. According to the invention, the or each hydraulic cylinder has both the hinged connection of the piston rod and the hinged connection of the cylinder to the associated barge section spaced the same distance from the vertical longitudinal center plane of the barge and located near the middle of the piston rod and the middle of the cylinder, respectively.

Keywords: Hopper barge



3,631,932

OFFSHORE DRILLING APPARATUS AND METHOD

Leonard A. Lindelof, Minneapolis, Minn., assignor to E. J. Longyear Company, Minneapolis, Minn.
Filed Sept. 3, 1968, Ser. No. 756,897
Int. Cl. E21b 7/12

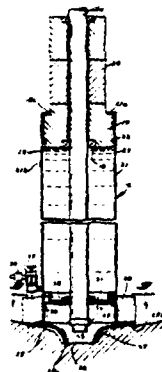
U.S. Cl. 175-6

26 Claims

Method and apparatus for taking core from a submerged earth formation that including drilling a casing into an earth formation a number of feet. A flotation tank is provided on the upper end of the casing while a cushion drum assembly is mounted on the lower end of the casing to control the rate of descent of the rotating casing into the formation; and such an assembly or weight on the lower end of the casing is provided to maintain the major portion of the casing in tension. After the casing is extended into the earth formation, a drill unit is supportedly mounted on the casing, a drill stem extended down through the casing and the drill stem drilled into the formation for continuing the core-taking operation.

Keywords: Sampler, seabed-drilled core

U.S. Cl. X.R. 173-147; 175-246



3,631,984
METHOD AND DEVICE FOR SEPARATION OF LIQUIDS
 Eric Rath, 2415 Calle Del Cero, La Jolla, Calif.
 Filed Aug. 8, 1969, Ser. No. 849,304
 Int. Cl. E02b 15/04

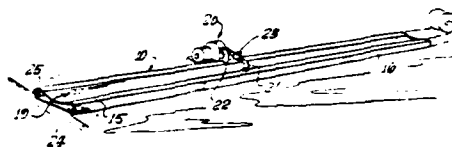
U.S. Cl. 210-83

5 Claims

This is a method and device for separation of liquids particularly in those situations where a contaminating liquid is entering another liquid and it is desired to contain the contaminating liquid in a limited area and separate it from the bulk of the other liquid. This is accomplished by the use of an airflow through a conduit which conduit hovers on the liquid by means of the airflow and creates a troughlike seal about the contaminating liquid and contains the same or cooperates with the conduit to remove the same by a troughlike skimming effect.

Keywords: Pollutant, surface barrier

U.S. Cl. X.R. 61-1F, 210-170; 210-242; 210-DIG.21



3,631,997
METHOD OF LOADING THE HOLD OF A VESSEL WITH DREDGING SPOIL

Jan De Koning, Amsterdam, Netherlands, assignor to N. V. Ingenieursbureau voor Systemen en Octrooien "Spanstaal", Rotterdam, Netherlands

Filed Nov. 12, 1969, Ser. No. 875,650
 Claims priority, application Netherlands, Nov. 15, 1968, 6816373

Int. Cl. B63b 27/24

U.S. Cl. 214-152

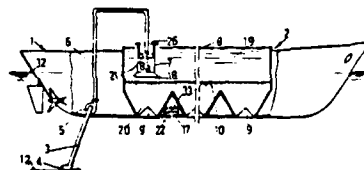
3 Claims

In the conventional method of loading a hold of a vessel with dredging spoil, in which a suspension of water and dredging spoil is admitted into the hold after the hold overflows until the required amount of dredging spoil is situated in the hold.

Much dredging spoil flows into the outboard water. A more efficient filling operation is obtained when the suspension is deposited in a tube which is so kept in the hold that it is surrounded by the hold on all sides, and which is kept at such a depth in the hold that the bottom of the tube always remains above the level of the settled part of the spoil, while the tube penetrates into the liquid.

Keywords: Dredge-spoil transport

U.S. Cl. X.R. 37-58; 114-26; 214-15B



3,632,508
METHOD AND APPARATUS FOR DESILTING AND/OR DESALTING BODIES OF WATER
 Barney Girden, 32 W. 76th St., New York, N.Y. 10023
 Filed Jan. 21, 1970, Ser. No. 4,667
 Int. Cl. B01d 21/00

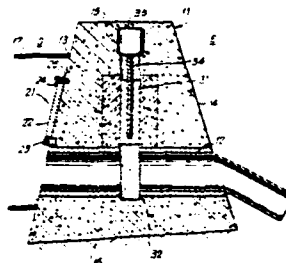
U.S. Cl. 210-65

5 Claims

One or more dam-like structures are used to isolate an estuary or lagoon from the ocean in order to be able to control the flow of water between the ocean and the estuary during changes in tide. The dam-like structure is provided with gates and valves for controlling one or more passages therethrough in order to control the flow of water between the ocean and the estuary in such predetermined manner so as to selectively de-silt the estuary, or de-salt the estuary by permitting the water in the estuary to be replaced by fresh water from the rivers feeding the estuary.

Keywords: Channel barrier; Channel Protection; Tidal estuary water quality; Tidal inlet

U.S. Cl. X.R. 61-30; 210-170



JANUARY 11, 1972

3,633,419

**EXPERIMENTAL BASIN AND MEANS FOR TESTING
BEHAVIORS OF OFFSHORE MARINE STRUCTURES**

Yukio Arita, Yoshiaki Nakao, both of Hiroshima;
Takashi Iwai, Saiki-gun, and Koozoo Tagaya, Hiroshima
all of Japan, assignors to Mitsubishi Jukogyo Kabushiki,
Kaisha, Tokyo, Japan

Claims priority, application Japan, Dec. 11, 1968, 43/90750
Int. Cl. G01m 10/00

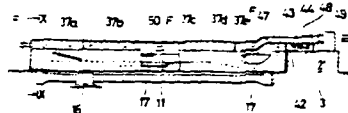
U.S. Cl. 73-148

2 Claims

A basin for testing the effect of a marine platform or similar marine structure characterized by providing a long basin, a wave-forming means provided at one end of said basin, a wave damper at the other end thereof, a water circulation channel extending along the outside of said basin to communicate with the bottom of each end of said basin in the proximity of each end, a water-feeding means to move the water in said channel in at least one direction and thereby to produce a stream or current as desired in the water in said basin.

Keywords: Hydraulic model basin;
Wave flume

U.S. Cl. X.R. 73-432SD



3,633,530

**FLOATING DEVICE FOR SUBMARINE WORKING
VEHICLES**

Toshio Murata, Matsudo, and Atsushi Yasui, Tokyo, both of
Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed July 17, 1970, Ser. No. 55,701

Claims priority, application Japan, July 21, 1969, 44/68507
Int. Cl. B63g 8/00

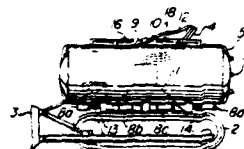
U.S. Cl. 114-16 E

3 Claims

A floating device for a submarine working vehicle, which comprises two floating tanks mounted on the body of the submarine working vehicle, each of said floating tanks having the interior thereof divided into a plurality of independent pressure air chambers, each of said pressure air chambers having a pressure air discharge conduit connected to the upper portion and a manhole provided at the lower portion thereof, said manhole being communicated with a pressure air supply conduit, and each of said conduits being provided with a valve by which the quantity of pressure air in the floating tank is adjusted so as to float the submarine working vehicle.

Keywords: Seabed grader

U.S. Cl. X.R. 61-69R



3,634,227

OIL SLICK ELIMINATION

William B. Patterson, Jr., Houston, Tex., assignor to
Dresser Industries, Inc., Houston, Tex.

No Drawing, Filed Sept. 9, 1969, Ser. No. 856,492

Int. Cl. E02b 15/04

U.S. Cl. 210-11

4 Claims

A method for rendering innocuous and/or eliminating an oil slick on a body of water by using an oil absorbent clay. An emulsifier can be used to allow the clay to sink in the body of water after absorbing the oil of the oil slick.

Keywords: Pollutant absorption

U.S. Cl. X.R. 210-40; 210-DIG.21

No Figure

3,634,607

ARMORED CABLE

Neil Coleman, Highland Park, Ill., assignor to Coleman Cable & Wire Company, River Grove, Ill.

Filed June 18, 1970, Ser. No. 47,240
Int. Cl. H01b 7/18

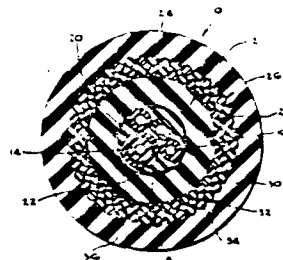
U.S. Cl. 174-120

7 Claims

An armored cable for use primarily in underwater geophysical exploration and in offshore oil-drilling operations includes helically wrapped layers of oriented thermoplastic strands surrounding a jacketed core of one or more insulated conductors for providing high-strength armored protection for the core while being resistant to the underwater environment.

Keywords: Instrument cable

U.S. Cl. X.R. 174-108; 174-110PM; 174-113R



JANUARY 18, 1972

3,635,032

BOOM FOR OIL SPILT ON WATER

Denis Henry Desty, Weybridge; Leslie Bretherick, Ascot, and Michael Guthrie Webb, Isle of Wight, all of England, assignors to The British Petroleum Company Limited, London, England

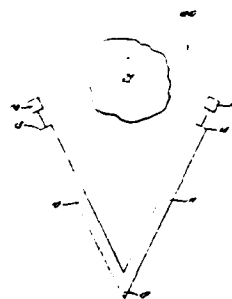
Filed Aug. 26, 1969, Ser. No. 853,116
Claims priority, application Great Britain, Sept. 13, 1968,
43,697/68
Int. Cl. E02b 15/04

U.S. Cl. 61-1 F

4 Claims

A floatable oil spillage boom which comprises two arms so as to give a V-configuration. The boom is deployed downwind of a slick which drifts into the apex so that it is concentrated to facilitate collection or destruction. Inflatable booms, e.g. air- and water-inflated are particularly suitable.

Keywords: Pollutant collection; Pollutant, surface barrier



3,635,033

BITUMINOUS COMPOSITIONS IN HYDRAULIC CONSTRUCTIONS

Hyico J. Th. Span, De Bilt, and Albert J. Woestenenk, Hintham, both of Netherlands, assignors to Bitumarin N.V., Zaithommel, Netherlands

Filed Dec. 2, 1969, Ser. No. 881,607
Claims priority, application Great Britain, Dec. 16, 1968,
59,690/68
Int. Cl. E02b 3/06

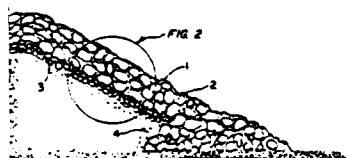
U.S. Cl. 61-4

8 Claims

A method is provided for the stabilization of a water permeable breakwater construction composed of open layers of stone or block. This method includes the steps of applying a viscous bituminous composition in discrete patches on the lining surface of the stone or block layers to form a discontinuous layer of the bituminous composition on the lining surface and then flowing the bituminous patches downwardly through the lining surface to thereby extend the discontinuous layer of the bituminous composition beneath the lining surface. The finished breakwater construction has openings which extend completely through the bituminous layer and all the layers of stone or block.

Keywords: Asphalt; Breakwater, rubble; Grouting; Revetment

U.S. Cl. X.R. 61-37



3,635,292
PILE GRIPS

Anthony Edward Walter Last, Stowmarket, England, assignor
to The British Steel Piling Co., Limited, Clayton Ipswich,
Suffolk, England

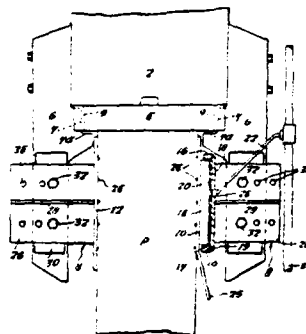
Filed July 17, 1970, Ser. No. 55,700
Int. Cl. E02d 7/00

U.S. Cl. 173-132

9 Claims

A fluid-operated pile driver incorporating a pair of jaw members to grip the pile to prevent the upward reaction force from lifting the housing of the driver during the downstroke of the ram, gripping of the pile being achieved through a piston attached to one of the jaw members, the piston and associated member being movable towards and away from the other jaw member by means of a diaphragm, subjected to the pressure of a fluid supply, cooperating with the piston.

Keywords: Pile driver, impact



3,635,342
METHOD AND APPARATUS FOR RECOVERING A
SUBSTANCE FLOATING AS A SHEET ON THE SURFACE
OF A LIQUID MASS

Jean-Claude Mourlon, Saint-Germain-en-Laye, and Ernest
Marie Rene Dubois, Sceaux, both of France, assignors to
Bertin & Cie, Plaisir, France

Filed Dec. 22, 1969, Ser. No. 887,297
Int. Cl. C02c 1/38

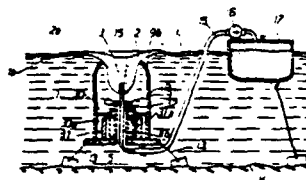
U.S. Cl. 210-84

15 Claims

For recovering a substance, more especially a hydrocarbon, spread as a thin sheet and floating on the surface of a liquid, the liquid is, in the vicinity of its surface, subjected to a local rotating movement so as to bring about the formation of a vortex-type cavity which is open and has a vertical axis, and in which the substance originating from the sheet accumulates, and from the said cavity the accumulated substance is extracted, the amount extracted being automatically replaced, as it is extracted, by further substance emanating from the sheet.

Keywords: Pollutant collection; Pollutant,
suction removal

U.S. Cl. X.R. 210-242; 210-DIG.21

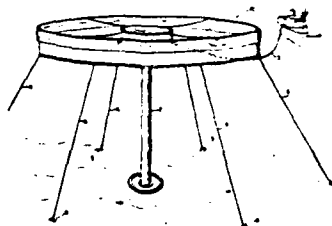


3,635,347
**APPARATUS FOR CONTROLLING THE DISPERSION OF
 POLLUTANTS FLOATING ON A BODY OF WATER**
 Edward J. Rupnick, 1501 Lincoln Ave. N.E., Renton, Wash.
 Filed Aug. 15, 1969, Ser. No. 850,420
 Int. Cl. C02b 9/02

U.S. Cl. 210-242 10 Claims

Dispersion of pollutants having specific gravities less than that of water and floating on a body of water are controlled by encircling the pollutant body with a floating reservoir wall having an open top and open bottom. The reservoir wall comprises an elongated length of flexible water-impervious material having disposed along its upper end a plurality of inflatable flotation cells inflatable through a common duct running the length thereof and having disposed along its lower end ballast means for maintaining the lower end of the wall beneath the surface of the pollutant and body of water. The ends of the reservoir wall are joined together in sealing relationship by compressively engaging inflated cells disposed along the ends of the reservoir wall. Pollutants issuing into a body of water can be directed into the interior of the enclosed reservoir formed by the reservoir wall by a flexible or inflexible conduit secured at one end around the source of pollution with the opposite end leading to the interior of the reservoir. The reservoir wall is held in a predetermined location by means of anchors resting on the floor of the body of water and connected by lead lines to the lower end of the reservoir wall.

Keywords: Pollutant, submerged barrier;
 Pollutant, surface barrier

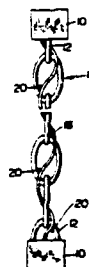


3,635,813
**ANODE SYSTEM FOR CATHODIC PROTECTION OF
 STRETCHED CHAIN**
 Richard W. Drisko, Oxnard, and Earl J. Kiefer, La Mesa,
 both of Calif., assignors to The United States of America as
 represented by the Secretary of the Navy
 Filed Mar. 3, 1969, Ser. No. 803,764
 Int. Cl. C23F 13/00

U.S. Cl. 204-197 1 Claim

The invention comprises cathodic protection against corrosion of stretched chain immersed in an electrolyte (sea water) in which sacrificial anodes of pure zinc are cast onto independent and spaced links of the chain. In order to ensure electrical continuity between adjacent links, a cable may be stretched therealong connecting each link to the spaced anodes. Thus when the chains are positioned in water having a high conductivity, e.g., sea water, the sacrificial anodes are consumed and an electrical current passes along the chain links so as to produce electrical potential and cathodically protect the chain from corrosion.

Keywords: Cathodic protection;
 Corrosion prevention



3,635,819
PROCESS FOR CLEANING UP OIL SPILLS
 Robert Kaiser, Cambridge, Mass., assignor to Avco Corpora-
 tion, Cincinnati, Ohio
 Filed June 15, 1970, Ser. No. 46,558
 Int. Cl. E02b 15/04

U.S. Cl. 210-40 10 Claims

The present invention relates to a system for controlling oil spills floating on open bodies of water. The process involves dispersing a hydrocarbon base ferrofluid containing an oil soluble water insoluble surfactant and a stable colloid of magnetic solids e.g. magnetite into the oil slick, then using a magnetic field to attract and pick up the oil spill, which is now magnetically responsive.

Keywords: Pollutant coalescence; Pollutant
 collection; Pollutant, mechanical
 removal

U.S. Cl. X.R. 210-65; 210-DIG.21; 252-62.51

No Figure

JANUARY 25, 1972

3,636,713

MARINE BLOCK

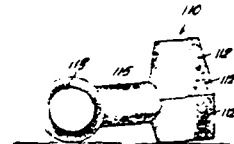
Raymond J. O'Neill, Yonkers, N.Y., assignor to Gratten
Marine Research Corporation, Yonkers, N.Y.
Filed Feb. 9, 1970, Ser. No. 9,558
Int. Cl. E02b 3/08, 3/14

Keywords: Concrete armor unit

U.S. Cl. 61—4

12 Claims

A marine block useable with other similar marine blocks in constructing marine structures such as groins, breakwaters, seawalls and seawall armor. The blocks are used in constructing structures in an arranged condition in which they are keyed together and may be disposed in a random arrangement. Each block is constructed as two massive, end cylinders of circular cross section joined together integrally by a center cylinder of lesser mass and diameter than the end cylinders. The end cylinders are arranged at 90° to each other so that one constitutes a horizontal cylinder and the other a vertical or upstanding cylinder.



3,636,718

WATER JETTED PILING

John B. Keats, Jeffersonville, Ind., assignor to Borg-Warner
Corporation, Chicago, Ill.
Filed Mar. 16, 1970, Ser. No. 19,566
Int. Cl. E02b 5/32, 7/24

Keywords: Offshore construction; Pile, concrete; Pile driver, water jet; Pile-driving shoe

U.S. Cl. 61—53.74

4 Claims

A pile and method of sinking piling into clay, sand or other material (which may be underwater) is disclosed employing a downward pointing hollow plastic nose cone base which is filled with concrete and through which water is jetted to erode away the earth. The exterior of the cone is broken by threads formed thereon to allow the pile to be advanced through strata of harder material such as shell layers. The upper surface of the nose cone includes a series of stair-stepped cylindrical flanges to receive different diameter plastic pipe. The piling may be formed of any height desired by adding additional pipe sections to the top of the initial pipe sections. The pipe sections are also preferably filled with concrete which may be reinforced by a spiral steel reinforcement rod. In assembling, the lightweight plastic members are solvent welded together at the site, concrete is poured into the nose cone about a central jetting pipe and the unit lowered to the earth. Then by either jet action or screw action or both, the piling is advanced into the earth to the desired depth. Additional pipe segments are added as needed as the piling drops further into the ground. Steel reinforcing rods and concrete are then added if desired.



3,636,908

MOBILE DOCK FOR SMALL CRAFT

Albert Feldman, 4 Upton Road, and Robert Feldman, 7 Lar-
nis Road, both of, Framingham, Mass.

Filed July 29, 1969, Ser. No. 845,759

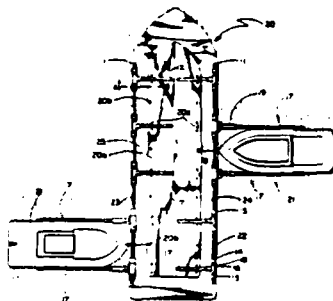
Int. Cl. B63b 21/00

U.S. Cl. 114—230

1 Claim

A mobile dock for small craft is described, comprising a ship whose hull has relatively straight and low sides and at least one substantially flat side deck. A track is mounted on the deck to hold movable assemblies. Each assembly has an elongated pole member pivotally movable in a transverse plane. A pair of pole members when extended out horizontally from the deck hold the hull of a small craft.

Keywords: Pier, floating; Pier, mobile;
Small-craft pier



3,637,080

**METHOD OF AND APPARATUS FOR SKIMMING
FLOTSAM FROM THE SURFACE OF A BODY OF
WATER**

Arthur L. Markel, Miami, Fla., assignor to Reynolds Interna-
tional, Inc., Richmond, Va.

Filed Oct. 9, 1970, Ser. No. 79,487

Int. Cl. E02b 15/04

U.S. Cl. 210—83

15 Claims

A method of and apparatus for skimming flotsam from the surface of a body of water. Floating material, such as oil, is directed toward and into pockets on a continuously driven conveyor belt means which serves to submerge the floating material beneath the surface of the water. A transfer of the material is made to a suitable conduit means from which the floating material is pumped to a suitable reservoir or station where it is separated from the water. When the skimmer is used to harvest plants or the like, a cutting means is placed in the entrance of the conduit to shred the plants.

Keywords: Pollutant, mechanical removal;
Pollutant removal watercraft;
Water plant removal

U.S. Cl. X.R. 210-242; 210-526



FEBRUARY 1, 1972

3,638,338
APPARATUS AND METHOD FOR DEEP SEA DREDGING
Arthur J. Nelson, 3304 Shasta Drive, San Mateo, Calif.
Filed Nov. 4, 1969, Ser. No. 873,985
Int. Cl. E02F 3/88

U.S. Cl. 37-65

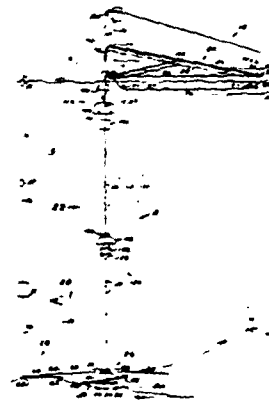
11 Claims

Keywords: Dredge, cutterhead; Dredge ladder control; Seabed trencher

U.S. Cl. X.R. 37-72; 37-195; 37-DIG.8;
61-46; 114-144; 175-7

A pair of cutters and a dredge pump mounted to a lowermost pontoon is immersed to penetrate the floor of a body of water employing an indicator to limit the depth of cut for the pendulous traverse over a selected floor area. Anchors are selectively embedded into the floor remote to the dredged area to which wires are connected extending from powered winches mounted on the lowermost pontoon. The extended anchored wires are intermediately supported by a buoyed pendant so as to elevate those wires off the floor to avoid prolonged dragging and contaminating effect to them. Consequential with the catenary curve resulting from that elevation, a tension is developed creating an artificial demand of a slacked wire paid off one of a pair of identical winches at a greater rate than the opposite wire hauled-in to effect the pendulous swing established by a wire fixed to an anchor axially central with but remote to the selected area. Each pendulous swing is at a radius shortened by a winch oriented in mounting with the two identical winches so that all wires lead from the winch as tangent lines direct to the anchor. The anchors are relocated by towing on a surfaced conduit pendant extending to a lower buoy of adjustable support capacity secured by a cable pendant to the anchor whereby the buoy lift capacity is increased to free the embedded anchor off the floor.

An articulative conduit in fluid communication between the pump and a delivery terminal on a surfaced service station is supported as a suspended tensioned array stabilized by immersed pontoons of selected and automatically adjusted support capacity responsive to changes encountered. An arrangement of hoists, structural provisions and utilization of pontoons common with the array facilitate the transfer of objects to and from the service station and the array to modify the dredging apparatus.



3,638,429
**APPARATUS FOR CONFINING MATERIAL FLOATING
 ON WATER**

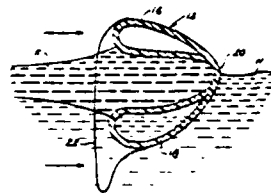
Theodore E. Sladek, La Mesa; John E. Palmer, Santa Ana,
 and Michael F. Steele, Costa Mesa, all of Calif., assignors to
 The Susquehanna Corporation, Fairfax, Va.
 Filed May 18, 1970, Ser. No. 38,111
 Int. Cl. E02b 15/04

U.S. Cl. 61-1 F

8 Claims

Apparatus for confining material floating on water, comprising a floating barrier having upper and lower pivotally connected sections. The upper section is buoyant and thus seeks the water surface, and the lower section is of neutral buoyancy so as to provide ballast and to remain below the surface of the water. A restraint strap is connected to the upper and lower sections to limit the relative movement therebetween. In operation, when there is an upward movement of the water surface, the upper section pivots upwardly to seek the water surface and the lower section remains below the water surface, thereby preventing the floating material from moving over or under the barrier. The restraint strap limits the movement of the upper section from a substantially horizontal position adjacent the lower section to a substantially vertical position when subjected to wave motion.

Keywords: Pollutant, surface barrier



3,638,430
**HIGH-STRENGTH FIRE-RESISTANT SPILL CONTROL
 BOOMS**

Millard F. Smith, P.O. Box 295, Saugatuck, Conn.
 Filed Apr. 14, 1969, Ser. No. 815,663
 Int. Cl. E02b 15/04

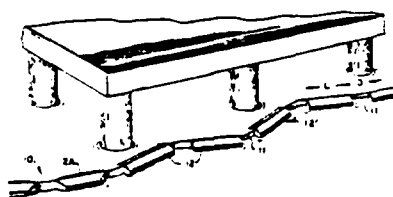
U.S. Cl. 61-1 F

9 Claims

Rugged high-strength fire-resistant floating booms, each incorporating a continuous flexible fin suspended at and extending below the surface of a body of water, supported by short floats formed of highly fire-resistant material, such as foamed aluminum blocks, spaced apart longitudinally along the upper edge of the fin to permit flexing and accordion folding of the structure and to provide flexible articulating movement with surface waves; all parts of each spill control boom being formed of highly fire-resistant and high-strength materials substantially impervious to impact, bending or snagging between vessels, docks, pilings and similar structures, and optionally incorporating resilient fender materials protecting the hulls of adjacent vessels and barges as well as docks and pilings from impact damage, while retaining spilled petroleum products or other floating materials discharged from a dockside vessel in the immediate vicinity of the spill, and preventing the movement of such spilled material under docks and other structures.

Keywords: Pollutant, surface barrier

U.S. Cl. X.R. 61-5



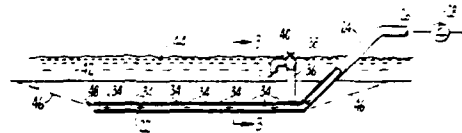
3,638,432
STATIONARY DREDGING APPARATUS
 Townsend L. Schoonmaker, 265 Summit Ave., San Rafael,
 Calif.

Filed Apr. 28, 1969, Ser. No. 819,715
 Int. Cl. E02b 3/02; E02f 5/28
 U.S. Cl. 61-2 10 Claims

This application discloses apparatus for removing sand and other sedimentary materials from waterways and other submerged locations comprising a generally horizontal perforated pipe extending across the bottom of the waterway and connected to a suction pump above the water level with a high-volume clear water supply conduit entering the perforated conduit near the perforations closest to the pump. The clear water supply may be provided by a suction apparatus or a pressure apparatus, and where the perforations are provided in the bottom of the perforated pipe, the pipe may dig its own channel in the bottom of a waterway.

Keywords: Channel protection; Dredge, suction; Tidal inlet

U.S. Cl. X.R. 37-58; 37-61



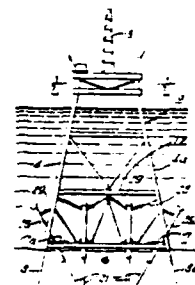
3,638,436
REVERSED SLOPE SKIRT PILE MARINE PLATFORM ANCHORING

Ivo C. Pogonowski, Houston, Tex., assignor to Texaco Inc., New York, N.Y.

Filed Oct. 17, 1969, Ser. No. 867,244
 Int. Cl. E02b 1/00
 U.S. Cl. 61-46.5 6 Claims

The invention relates to a marine platform for supporting a deck or a similar working structure above the water's surface at an offshore location. The platform includes an uprightly positioned support jacket that extends to the sea floor, having anchoring means at the lower end for fixedly positioning the jacket in place. The anchoring means is so arranged with respect to the jacket to firmly locate the latter even though the anchoring substratum be underconsolidated, or characterized by generally poor holding ability. Said anchoring means embodies a series of peripherally located skirt piles that are sloped inwardly at an angle toward the support jacket interior to increase the resistance of the jacket to being displaced or upset from a vertical disposition. Lateral storm loads imposed against the jacket are thus transferred to the foundation strata by axial pile loads only. Safety, stability against overturning and total collapse of the entire marine structure is thereby improved.

Keywords: Offshore platform, fixed; Pile placement; Seabed foundation



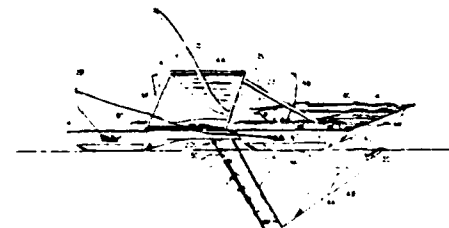
3,638,439
EMBEDDING CABLELIKE MEMBERS
 Otto C. Niederer, Old Lyme, Conn., assignor to Aqua-Tech, Inc., Norwalk, Conn.

Filed Mar. 16, 1970, Ser. No. 19,853
 Int. Cl. F16f 1/00; E02f 5/02
 U.S. Cl. 61-72.4 18 Claims

Cable embedment with apparatus comprising a water bed contacting support assembly, an entrance guide having a longitudinal axis, a depressor extending generally along a continuation of the axis rearward of the entrance, a jet assembly extending beneath the depressor, and, connected to the jet assembly, a source of fluid under pressure for creating a jet flow at a flow rate sufficiently high and a pressure sufficiently low to temporarily liquify water bed soil in the path of the cable without substantial permanent soil displacement.

Keywords: Seabed cable plow; Seabed trencher

U.S. Cl. X.R. 37-61



3,638,601
ACOUSTICALLY TRANSPARENT HYDRODYNAMIC
TOWED BODY FOR UNDERWATER EXPLORATION
AND THE LIKE

Neville E. Hale, Port Credit, Ontario, and Kenneth Gardner,
Mimico, Ontario, both of Canada, assignors to Fathom
Oceanology Limited, Port Credit, Ontario, Canada

Filed Aug. 11, 1969, Ser. No. 848,877

Claims priority, application Great Britain, Sept. 3, 1968,
41,756/68

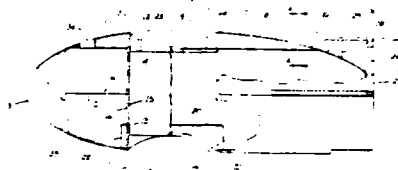
Int. Cl. B63b 21/00

U.S. Cl. 114—235 B

7 Claims

A submersible towable body for underwater acoustic purposes comprising an acoustically transparent shell which is supported by an internal body structure in the form of an acoustically transparent compartment for receiving a transducer and having a transducer removably mounted in the compartment so that the towed body retains its structural integrity independently of the transducer.

Keywords: Towed vehicle



3,638,738
PILE DRIVING APPARATUS

Dexter L. Varnell, 4200 Scotland St., Apt. 82, Houston, Tex.

Filed Aug. 3, 1970, Ser. No. 60,289

Int. Cl. E02d 7/00

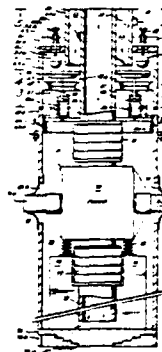
U.S. Cl. 173—90

10 Claims

Pile driving apparatus adapted to apply a driving force to casing or piling to force same into the ground, wherein successive slugs of water are dropped under pressure to impart successive down blows to the apparatus, which blows are transmitted to the casing or piling, whereby increased blows can be imparted with a minimum weight for the apparatus.

Keywords: Offshore construction; Pile driver, impact

U.S. Cl. X.R. 61-53.5; 173-126



3,638,796
APPARATUS FOR PREVENTING OIL POLLUTION
Ray Tuggle; Richard H. Graves, both of Houston, Tex., and
Ray J. De Rouen, New Iberia, La., assignors to Texaco Inc.,
New York, N.Y.

Filed Dec. 31, 1968, Ser. No. 816,876

Int. Cl. B01d 21/24

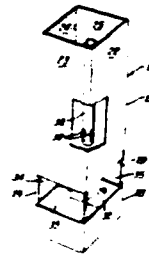
U.S. Cl. 210—170

5 Claims

An oil pollution control apparatus that isolates a portion of a substantial body of water. The portion isolated extends from above the surface to near the bottom of the body of water. A structural example is a vertical caisson with its base extending into the bottom of the body of water and with openings just above that bottom to permit circulation of the water at that level.

Keywords: Offshore caisson; Pollutant, submerged barrier; Pollutant, surface barrier

U.S. Cl. X.R. 210-250; 210-519



FEBRUARY 8, 1972

3,640,073

BARRIER FOR DEFINING A SWIMMING AREA

Frank J. Samsel, 13455 Lake Ave., Lakewood, Ohio

Filed May 7, 1969, Ser. No. 822,400

Int. Cl. E02b 3/00, 15/00, 15/04

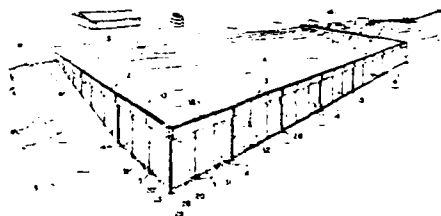
U.S. Cl. 61-1 F

6 Claims

This invention relates to a floatable barrier comprising a plurality of sections or panel members, removably secured together to form an integrated structure for use in isolating or defining a confined area along the edge of a body of water, which area can be treated and made safe for human occupancy. Each section or panel member is formed of a flexible sheet of impervious material with the upper edge portion thereof overlapped to define a chamber coextensive with the width of the section for receiving floatable material which may be either a solid or a gas and the lower edge portion reinforced and secured to anchoring means, for maintaining the sections in a substantially vertical position when disposed within the water.

Keywords: Pollutant, submerged barrier;
Pollutant, surface barrier

U.S. Cl. X.R. 4-172; 4-172.19



3,640,075

METHOD OF INSTALLING BREAKWATER CAISSONS

James H. La Peyre, 13 Richmond Pl., New Orleans, La.

Filed Oct. 16, 1969, Ser. No. 866,823

Int. Cl. E02b 3/06

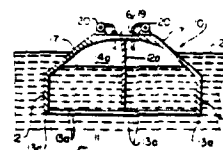
U.S. Cl. 61-5

2 Claims

This disclosure is directed to caissons and to a method of constructing seawalls, breakwaters, jetties, groins and the like utilizing the caissons which are closed sided, hollow, bottomless and compartmented precast concrete structures adapted to be air pressurized for flotation in water with their bottomless sides downward to the erection site and then depressurized and sunk into position and anchored against movement by imbedding in the water bottom and by filling with dredged and/or pumped in solids.

Keywords: Breakwater, concrete; Offshore caisson; Offshore construction; Seawall

U.S. Cl. X.R. 61-46



3,640,413

BOAT CRANE

Carl Robert Klein, 403 Northwest Street, Bellevue, Ohio
Filed Dec. 29, 1969, Ser. No. 888,776
Int. Cl. B60p 3/10

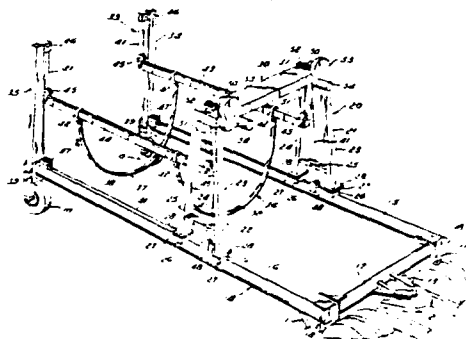
U.S. Cl. 214-396

5 Claims

Straddle-type boat crane for lowering and lifting boats into and out of the water and for transporting them to and from the water. The crane includes fixed position forward and rear hoists, the latter being free of any fixed or movable transverse member and providing unlimited inside clear height at all times for ease and convenience in handling boats having high superstructures or tall spars.

Keywords: Small-craft launcher

U.S. Cl. X.R. 212-14; 294-74



3,641,484

CONTOUR-MAPPING SYSTEM

Donald J. White, Natick, and William R. Navin, Jr., Raynham, both of Mass., assignors to General Instrument Corporation, Newark, N.J.

Filed Mar. 10, 1970, Ser. No. 18,137

Int. Cl. G01s 9/66

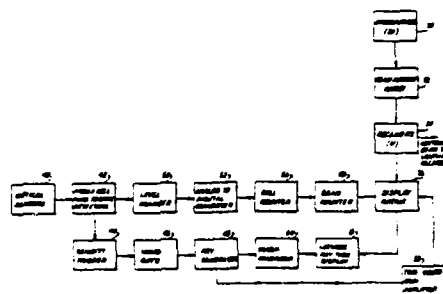
U.S. Cl. 340-3 R

8 Claims

A system for mapping the contour of a surface from a mapping vehicle moving over said surface and having means for transmitting and receiving reflected radiation from said surface and which includes a display scope adapted to produce a visual trace in successive sweeps representing said surface contour. Means are provided for timing the commencement of said trace along said sweep in accordance with the angular position of said vehicle receiving means so that the angular position of said trace corresponds to the true angular position of said vehicle with respect to the vertical.

Keywords: Sonar, depth sounder

U.S. Cl. X.R. 340-3F; 340-3PS; 340-5CM; 343-5PM



FEBRUARY 15, 1972

3,641,770

FLOATING OIL CONFINING APPARATUS

Hugh J. Fitzgerald, Austin, Tex., assignor to Ocean Pollution Control, Inc., Dallas, Tex.

Filed June 25, 1969, Ser. No. 836,545

Int. Cl. E02b 15/04; F16l 39/02; B01d 17/02

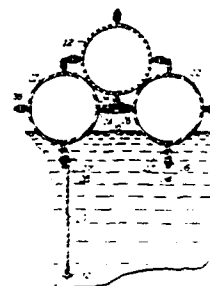
U.S. Cl. 61-1

3 Claims

Apparatus for confining and removing oily material on the surface of a body of water consisting of a polygonal ring formed by flexible tubular float members inflated to a pressure on the order of 0.5 p.s.i., with a weighted skirt depending therefrom, and with a transfer pipe having its inlet end removably supported in the leeward corner of the ring at a level within the thickness of the oily accumulation.

Keywords: Pollutant, surface barrier

U.S. Cl. X.R. 138-111; 210-242



3,641,771

APPARATUS AND METHOD FOR CONFINING AND COLLECTING OIL FLOATING ON A WATER SURFACE

Howard D. Spandau, Houston, Tex., assignor to David M. Johnson and Robert L. Fleming, part interest to each

Filed Aug. 14, 1969, Ser. No. 849,985

Int. Cl. E02b 15/04

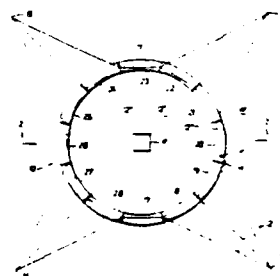
U.S. Cl. 61-1 F

5 Claims

A series of gas inflated bodies are secured end-to-end to form a buoyant toroidal barrier which confines oil floating within the area circumscribed by the barrier. Each of the bodies includes a coupling means which secures adjacent bodies together in a leakproof seal and also acts as a harness structure for anchoring the composite toroidal body in place. Water and/or oil may be placed inside the inflated bodies to act as ballast and to provide storage for oil.

In a modified form, a number of the inflated bodies are secured to each other and attached to the main barrier to form a lock which permits vessels to enter or leave the circumscribed area without loss of any of the confined oil.

Keywords: Pollutant, surface barrier



3,641,780

TRENCHLESS LAYING OF PIPE UNDERGROUND

Ainsley N. Ede, 36 Thornton Way, Cambridge, England
Original application May 3, 1968, Ser. No. 726,495, now
Patent No. 3,546,890, dated Dec. 15, 1970. Divided and this
application July 10, 1970, Ser. No. 53,796

Claims priority, application Great Britain, May 3, 1967,
20,476,67

Int. Cl. F16I 1/00, E02I 5/18

U.S. Cl. 61-72.4

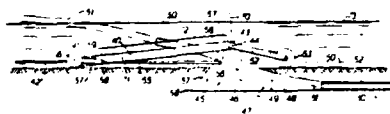
6 Claims

The invention is a method and apparatus for the trenchless laying of pipe underground, in which a mole plough is forced through the ground by means of a tractor or winch to form an underground tunnel, and a continuous length of flexible sleeving, for example made of polythene, is fed down through the hollow coupler of the advancing mole plough and is laid in the newly formed tunnel behind the mole, and at the same time a length of rigid pipe is thrust forwards lengthwise into the tunnel and within the sleeving laid behind the advancing mole plough, by means of a driving machine including sets of pneumatic-tired driving rollers between which the pipe is frictionally engaged. The pipe length is forced forwardly within the sleeving from the start of the underground tunnel at a speed which is coordinated with the speed of travel of the mole plough, for example by means of a trailing marker, so that the leading end of the pipe length follows closely behind the rear of the advancing mole. In this way the pipe length is pushed into its final position enclosed in the protective sleeving which protects it against corrosive attack by soil water. If desired cement grout may be injected into the sleeving to form an auxiliary protective coating around the pipe.

The specification also describes a modified form of mole plough designed to be used in a submerged position for pipe laying by the described method in a river bed or estuary bed, and to be rendered buoyant by means of compressed air for navigation purposes. This mole plough has a hollow framework and pivoted front and rear undercarriages with pivoted hollow rollers which also act as floats.

Keywords: Seabed cable plow; Seabed pipeline placement

U.S. Cl. X.R. 37-193; 61-72.5



3,642,089

MARINE IMPLODER-TYPE ACOUSTIC IMPULSE GENERATOR

Marion L. Parker, and Hillman Southwick, both of Houston, Tex., assignors to Western Geophysical Company of America, Houston, Tex.

Filed July 23, 1969, Ser. No. 844,011

Int. Cl. G01V 1/00

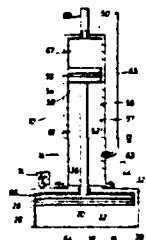
U.S. Cl. 181-0.5 R

11 Claims

An acoustic impulse generator for producing in a liquid body acoustic impulses useful, for example, in geophysical explorations. The generator includes a housing which defines an enclosed chamber having a movable slidably mounted piston. Fluid-operated driving means including fluid spring means in one operating condition cause the piston to execute a forward stroke in the liquid body thereby storing potential energy in the liquid body and in the fluid spring means. The driving means in another operating condition allow the piston to execute a return stroke in a relatively short time interval thereby generating an acoustic impulse.

Keywords: Seismic implosive acoustic transmitter

U.S. Cl. X.R. 181-0.5H; 181-0.5AG; 340-12; 340-17



3,642,090
MARINE IMPLUDER-TYPE ACOUSTIC IMPULSE
GENERATOR

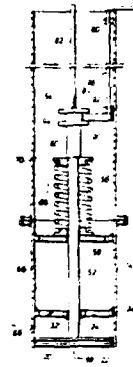
Grant S. Bennett, Ossineke, Mich., assignor to Western
Geophysical Company of America, Houston, Tex.
Filed July 23, 1969, Ser. No. 844,019
Int. Cl. G01V 1/00

U.S. Cl. 181-0.5 H 10 Claims

An acoustic impulse generator for producing in a liquid body acoustic impulses useful, for example, in geophysical explorations. The generator includes a housing which defines an enclosed chamber having a movable wall. Driving means in one operating condition cause the movable wall to execute a forward stroke in the liquid body thereby storing potential energy in the liquid body and in the generator. The driving means in another operating condition allow the movable wall to execute a return stroke in a relatively short time interval thereby generating an acoustic impulse.

Keywords: Seismic implosive acoustic transmitter

U.S. Cl. X.R. 340-12R



3,642,140
OIL RECOVERY AND CLEANUP SYSTEM

James H. Parker, P.O. Box 1652, Norfolk, Va.
Filed Mar. 23, 1970, Ser. No. 21,810
Int. Cl. C02b 9/02

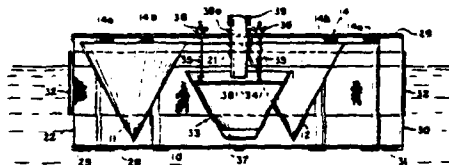
U.S. Cl. 210-242 18 Claims

An oil recovery unit is provided for recovery of oil floating on the surface of the water in which the recovery unit has a plurality of float elements of decreasing diameter from top to bottom associated with one another to define a floating frame. Oil collection means centrally positioned within the defined floating frame with the top surface of the collection chamber means being below the top surface of the float element, and oil drawoff means associated at one end with the oil collection chamber means and the opposite end thereof connected to pump means remotely located from the recovery end for drawing off the collected oil.

An oil processing unit is provided for use in association with the recovery unit in which the oil mixture collected by the recovery unit is passed continuously into a collection chamber wherein the oil mixture is permitted to settle into an oil phase and a water phase, with the oil phase being passed to a collection zone for subsequent drawoff and the water phase being passed at low velocity continuously through at least two other processing stages to remove entrained oil and to discharge the water back to where it came, or otherwise disposed of.

Keywords: Pollutant, suction removal

U.S. Cl. X.R. 210-DIG.21



FEBRUARY 22, 1972

3,643,446

MARINE PLATFORM FOUNDATION MEMBER

George E. Mott, Metairie, La., assignor to Texaco Inc., New York, N.Y.

Filed Apr. 6, 1970, Ser. No. 25,943

Int. Cl. E02b 17/00; E02d 27/04

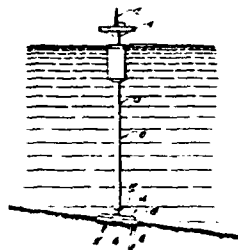
U.S. Cl. 61—46.5

8 Claims

Keywords: Grouting; Offshore construction; Offshore platform anchor

U.S. Cl. X.R. 9-8; 175-7

The invention relates to an anchor or foundation member for positioning a buoyant platform at an offshore location characterized by a sloping or irregular floor surface. The anchor includes initially separable members which are floated to an operating or anchoring site. A coupling member depending from the anchor is adapted to engage the lower end of the elongated, buoyant structure for retaining the latter in place at the water's surface. The coupling member is adjusted into vertical alignment with a connector depending downwardly from the marine structure. While being held in the upwardly aligned position by an enclosing retainer, a hardenable fluid such as cement is introduced to solidify and form the coupling and retainer member into a singular body.



3,643,448

FLOATING LANDING STAGES

Walter Bower, Newark, England, assignor to Thos. Storey (Engineers) Limited, London, England

Filed Apr. 21, 1970, Ser. No. 30,419

Claims priority, application Great Britain, Apr. 24, 1969, 20,976/69

Int. Cl. E02b 3/20; E02c 5/02

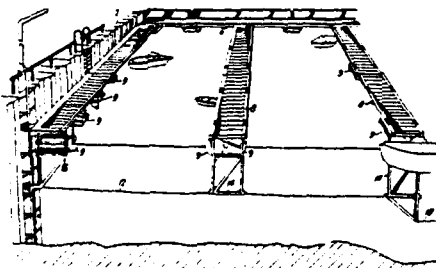
U.S. Cl. 61—48

4 Claims

Keywords: Pier, floating; Small-craft pier

U.S. Cl. X.R. 61-65

A floating landing stage including a plurality of floating jetties the free ends of adjacent jetties being interconnected by ties which prevent any substantial movement of the jetties relative to each other or to the remainder of the landing stage and which are located beneath the surface of the water so as to allow passage of craft between the jetties. Guide means is provided to restrain the movement of the landing stage relative to the shore so that the landing stage can rise and fall with the water in which it is floating without any substantial lateral movement.



3,644,882
MARINE ACOUSTIC VELOCITY PROFILING
 Kenneth E. Burg, Dallas, Tex., assignor to Texas Instruments
 Incorporated, Dallas, Tex.
 Filed Aug. 28, 1969, Ser. No. 853,646
 Int. Cl. G01v 1/28

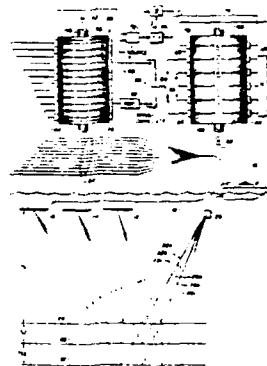
U.S. Cl. 340-7

6 Claims

A marine vessel streams a plurality of hydrophones while sequentially generating acoustic waves along a marine traverse at spaced-apart intervals to provide common depth point coverage of reflecting horizons within the water layer. The hydrophones receive reflections from the water layer to generate signals which are then recorded. Cross-correlations are taken of selected gates of the signals, the gates being related to one another in dependence upon the horizontal spacing between ones of the hydrophones. Acoustic velocity is the variable in the cross-correlations. The cross-correlation products are summed to produce a composite velocity correlation function, the peak point of which provides an indication of the acoustic velocity of the underwater section through which the reflections of the acoustic waves travel. Arithmetic operations are performed on the acoustic velocities to provide a substantially real-time profile of the acoustic velocity of the intervals between the underwater reflecting horizons.

Keywords: Seismic record processor;
 Seismic survey method

U.S. Cl. X.R. 340-15.5



FEBRUARY 29, 1972

3,645,018
**METHOD AND APPARATUS FOR EXCLUDING SILT
 FROM A DREDGING OPERATION**
 Jan De Koning, Soetendaal 20, Amsterdam, and Romke van
 der Veen, 21 Prof. Dr. Hesselaan, Jutphaas, both of
 Netherlands
 Continuation-in-part of application Ser. No. 729,229, May 15,
 1968. This application Mar. 28, 1969, Ser. No. 811,396
 Int. Cl. E02f 3/88

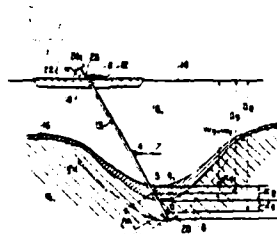
U.S. Cl. 37-58

7 Claims

By measuring pressures in the particulate solid material surrounding a suction pipe at known points spaced along the pipe, sand of one known specific gravity which is covered by a layer of silt of another specific gravity may be dredged to the exclusion of the silt. Due to the difference in specific gravities, the approximate location of the interface between the sand and silt may be monitored and the lower end of the pipe moved so as to maintain it below such interface at all times during the dredging operation.

Keywords: Dredge, suction; Dredge intake;
 Seabed property measurement

U.S. Cl. X.R. 37-195; 73-151; 73-407R;
 175-50



3,645,099

BUOYANT OIL SLICK RETAINING STRUCTURE

Manuel Saavedra, San Pedro, Calif., assignor to Roberto Aldana, San Pedro, Calif., a part interest

Filed Aug. 6, 1970, Ser. No. 61,727

Int. Cl. E02b 3/04, 15/04

U.S. Cl. 61-1 F

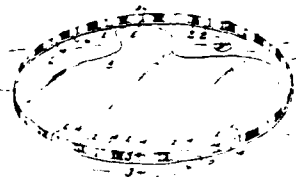
7 Claims

A number of elongate rectangular panel structures that may be removably connected to one another in end-to-end relationship to be extended around an oil slick floating on the surface of a body of water to confine the slick. Each of the panel structures includes an elongate rectangular pliable sheet of double thickness that has two elongate longitudinally extending buoyant members disposed on opposite sides thereof and secured thereto at positions intermediate the top and bottom thereof. The buoyant members cause a substantial section of the sheet to extend above the body of water and serve as a barrier to confine the oil slick floating thereon.

Each of the panel structures has at least one intermediately disposed section that is of accordianlike structure that has a number of vertically disposed stiffeners included as a part thereof, which stiffeners serve to maintain the section in a substantially vertically disposed position when the section is floating on a body of water. The intermediate sections due to the accordianlike structure thereof, permit sheet sections on opposite sides thereof to shift vertically when subjected to wave action. Due to the above described construction of the panel sections, the panel structures not only tend to remain in a substantially vertical position when floating, but will not tip when subjected to wave action to the extent that oil from the slick may flow thereover. Stabilization of the panel structures when in a floating position is further attained by securing weights to the lower part of the portions thereof that are of accordianlike configuration.

Keywords: Pollutant, surface barrier

U.S. Cl. X.R. 210-242; 210-DIG.21



3,645,104

TOWER STRUCTURE

Roy E. Hogan, Berwick, La., assignor to Phillips Petroleum Company

Filed Dec. 29, 1969, Ser. No. 888,593

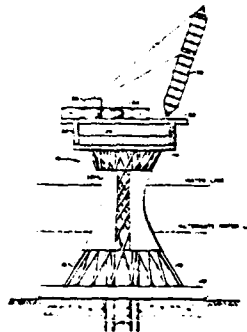
Int. Cl. E02b 17/00

U.S. Cl. 61-46.5

19 Claims

A tower structure embodying the geometric properties of a hyperboloid of one sheet. Said tower comprises a lower base, an upper platform, and a plurality of inclined legs extending between said base and said platform. Said inclined legs are so inclined and so spaced, with respect to a central axis, so that upon revolution of any one of said legs about said axis at an essentially constant angle of inclination there is described a surface of revolution which defines said hyperboloid.

Keywords: Offshore platform, fixed; Offshore storage tank, emergent; Seabed foundation



3,645,345

DYNAMIC PILE-DRIVING SHOES

Horace W. Olsen, Houston, and Max Bassett, P.O. Box 808, South Houston, both of Tex., assignors to said Bassett, by said Olsen

Filed July 14, 1970, Ser. No. 54,774
Int. Cl. E21b 1/06

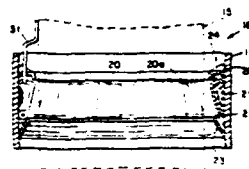
U.S. Cl. 175-56

8 Claims

An annulus encircles the lower end portion of a pile which is impacted at its upper end. The annulus contains a radially contractable and expansible collar consisting of a plurality of individual segments, and an expansible and contractable hollow ring is interposed between the annulus and the collar. The collar is actuated by hydraulic fluid under pulsating pressure, so that the collar segments impart vibration to the pile while it is being driven into the earth. The hollow ring has at least two segmental sections each spanning only a portion of the total number of collar segments, and the hydraulic fluid supply is controllable by valves so that the ring segments may be actuated in unison or in alternating succession.

Keywords: Offshore construction; Pile driver, vibratory; Pile-driving shoe

U.S. Cl. X.R. 61-53.5; 175-19; 175-56; 175-103; 175-171



MARCH 7, 1972

3,646,770

METHOD AND APPARATUS FOR STABILIZING AN OFFSHORE DRILLING PLATFORM STRUCTURE

Francis Van Duulen, The Hague, Netherlands, assignor to Shell Oil Company, New York, N.Y.

Filed June 5, 1970, Ser. No. 43,875
Int. Cl. E02d 21/00, 3/10

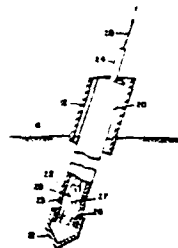
U.S. Cl. 61-46.5

8 Claims

A method and apparatus for stabilizing an offshore drilling platform structure adapted to rest on the floor of a body of water by perforating at least one of the piles of the structure, thereby establishing fluid communication between the soil surrounding the pile and the interior of the pile. The fluid level in the pile is then maintained at a relatively constant low level.

Keywords: Offshore platform, fixed; Pile, concrete; Pile, steel; Seabed foundation; Seabed soil treatment

U.S. Cl. X.R. 61-11



3,646,901
WATERCRAFT ESPECIALLY USEFUL FOR THE
RECOVERY OF OIL

Allan R. Budris, Nudley; Frank J. McGowan, Murray Hill;
Lewis M. Evans, Upper Montclair; Theodore J. Wayne,
Linden, all of N.J.; Eric E. Litten, Garden City, Long
Island, and Charles B. Darcy, Glen Head, Long Island, both
of N.Y., assignors to Worthington Corporation, Harrison,
N.J.

Filed Feb. 1, 1970, Ser. No. 7,650
Int. Cl. B63b 35/00; B63b 11/00

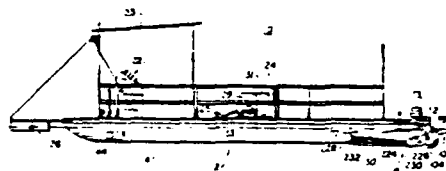
U.S. Cl. 114-0.5

64 Claims

Keywords: Pollutant, mechanical removal;
Pollutant removal watercraft

U.S. Cl. X.R. 115-12; 210-242

A watercraft is disclosed which comprises a body member of the catamaran-type having spaced-apart twin hulls between which is disposed an oil recovery system which can recover oil (for instance in the form of an oil slick) which has been properly directed by the hulls of the craft. The watercraft has a generally centrally located turning axis; first and second propulsor means secured to the body member for accepting water at an inlet opening thereof and discharging water at a higher velocity at discharge openings thereof; first thrust generating means in fluid communication with the discharge opening of the second propulsor means for generating thrust in a first direction about the turning axis; second thrust generating means in fluid communication with the discharge opening of the first propulsor means for generating thrust in the first direction about the turning axis; third thrust generating means in fluid communication with the discharge opening of the first propulsor means for generating thrust in a second direction about the turning axis; fourth thrust generating means in fluid communication with the discharge opening of the second propulsor means for generating thrust in the said second direction about the turning axis; and maneuverability control means on the body member for selectively establishing or nonestablishing the fluid communication between the first and second propulsor means and the first, second, third, and fourth thrust generating means respectively. Additionally each of the propulsor means may be removably secured to the rear of the body member and includes a particularly advantageous construction comprising a multifunction one-piece casting; a propulsor housing secured to the undersurface of a rearwardly extending portion of the one-piece casting; a prime mover secured to the upper surface of the said rearwardly extending portion of the one-piece casting; and a water gathering collection chamber secured to the propulsor housing for helping to establish the necessary pressure head used in the maneuverability system of the craft.



3,647,009

FLUKED CORE RETAINER

Joseph A. Drelicharz, 2317 Chico Court, Oxnard, Calif.
 Filed Sept. 17, 1970, Ser. No. 72,907
 Int. Cl. E21b 25/00

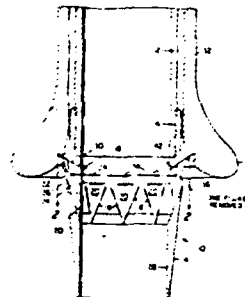
U.S. Cl. 175-242

5 Claims

An arrangement for retaining a soil sample in a sampling tube, especially but not exclusively from remote locations such as the floor of the ocean or other body of water. A series of pivoted fingers are circumferentially spaced about the end of the tube, each finger having a sharp leading edge and a fluked rear edge which catches in the soil surrounding the tube when the latter is withdrawn. This pivots the leading edge inwardly to close the lower end of the tube and supports the enclosed soil sample during tube withdrawal.

Keywords: Sampler, seabed-driven core

U.S. Cl. X.R. 175-254



3,648,226

VIBRATION ISOLATION MODULE FOR TOWED CABLES

Hugh M. Fitzpatrick, Chevy Chase, Md.; James J. Neville, Kinnelon, N.J.; John Thompson, State College, Pa., and Fitzhugh W. Boggs, deceased, late of Hampton, N.J. (by Elizabeth M. Boggs, executrix), assignors to The United States of America as represented by the Secretary of the Navy

Filed Mar. 23, 1970, Ser. No. 21,641
 Int. Cl. B63b 21/00

U.S. Cl. 340-5 R

10 Claims

A vibration-isolation link employing pistons or diaphragms responsive to the difference in pressure between the stagnation pressure and the ambient pressure to compensate for the drag force of a towed body and employing a soft spring to maintain the piston or diaphragm in an equilibrium position.

Keywords: Towing cable

U.S. Cl. X.R. 114-235A; 340-7R; 340-17



MARCH 14, 1972

3,648,463

FLOATING BOOM FOR OIL-SOAKED MATERIAL

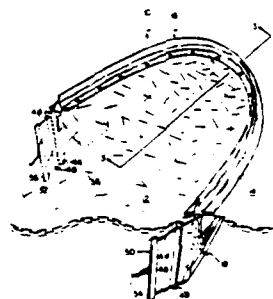
Ray R. Ayers, 12522 Shepherd's Ridge, Houston, Tex.
 Filed Sept. 8, 1970, Ser. No. 70,098
 Int. Cl. E02b 15/04

U.S. Cl. 61-1 F

3 Claims

Apparatus for containing or collecting oil-soaked material in a body of water is disclosed. The apparatus comprises an elongate buoyant boom having a foraminous skirt depending therefrom. An impervious shaped section is secured to the bottom of the foraminous skirt to react against water movement under the boom to maintain the lower skirt end depressed in the water. A spreader bar is used to maintain the top and bottom of the skirt spaced a predetermined distance apart.

Keywords: Pollutant collection; Pollutant, surface barrier



152

3,648,464

**METHOD AND MEANS FOR PLACING ARTIFICIAL
SEAWEED**

Keith W. Edwards, 47 Station Road, Thames Ditton, England
Filed Jan. 22, 1970, Ser. No. 5,001

Claims priority, application Great Britain, Jan. 22, 1969,
3,579/69

Int. Cl. E02b 3/04; E02d 7/24

U.S. Cl. 61-3

5 Claims

A method and means for placing "artificial seaweed" in place on a particulate floor of a body of water comprises releasably securing the lower end of a fluid conduit to an anchoring means, such as a dish-shaped plastic article, having strands of buoyant, water-resistant elongated flexible strands secured thereto and having fluid outlet orifices communicating with said fluid conduit and directed against said particulate floor; forcing fluid through said conduit while said anchoring means is adjacent to or resting on or pressed against said floor to displace particulate matter; causing said anchoring means to settle into the resulting cavity as it is formed; discontinuing flow of said fluid; permitting particulate to settle over said anchoring means; and disconnecting said conduit.

Keywords: Artificial seaweed; Embedment
anchor; Seabed material placement

U.S. Cl. X.R. 61-53.74; 111-7.1



3,648,466

**ELEVATED RESERVOIR FOR USE WITH OFF-SHORE
OIL WELLS**

Henri Houdin, 18 rue Theodore de Banville, Paris, and Rene
Pernu, 42 rue de Sevres, Boulogne, both of France
Filed May 4, 1970, Ser. No. 34,060

Claims priority, application France, May 5, 1969, 6912401

Int. Cl. E02d 21/00; E02b 17/00; E04b 1/22

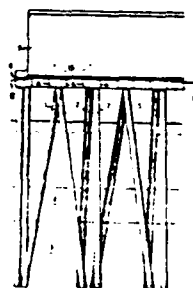
U.S. Cl. 61-46

10 Claims

Elevated reservoir carried by platform which comprises a plurality of box-like sections, each of which is supported by a plurality of inclined pilings. Adjacent sections are spaced by ribs aligned with their sides and connected by prestressing cables extending through the ribs and box sides. The platform enables the piles to act as a unit in resisting horizontally applied forces.

Keywords: Offshore construction; Offshore
platform, fixed; Offshore storage
tank, emergent; Pile, structure
connection

U.S. Cl. X.R. 52-250; 61-50



3,648,514

MEANS FOR MEASURING FORCES, NOTABLY AT THE FOOT OF AN OSCILLATING COLUMN OR AN OFFSHORE DRILLING PLATFORM

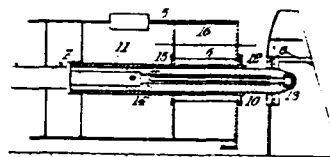
Robert H. Vilain, Maisons-Alfort, France, assignor to Compagnie Francaise D'Enterprises Metalliques, Paris, France
Filed Nov. 20, 1969, Ser. No. 878,459
Claims priority, application France, Nov. 20, 1968, 174,568
Int. Cl. G01H 5/00

U.S. Cl. 73-100

6 Claims

An offshore drilling platform, having a column attached through a universal joint and a bottom coupling block to a base fixed to the seabed, the connection between the bottom coupling block and said base being effected through at least three points, by two members at each point, including systems for measuring the forces exerted on the base at said three points at least, thereby to deduce the magnitude and direction of the hydrodynamic force exerted on the column, each said system comprising in combination a flexural element forming part of means for securing said members together, a nonflexing rod borne within and fixed by one end to said element, and a sensor located adjacent the free end of the rod so that the displacements of said free end of the rod relative to said element are transmitted to said sensor.

Keywords: Offshore platform anchor; Offshore platform, floating; Pile load measurement



3,648,637

HOPPER BARGE DRIVABLE WITH A DRIVING MEANS

Frans Krauthremer, Niederspaw, Rhine, Germany, assignor to Schuttel-Werft, Josef Becker KG., Oberspaw, Rhine, Germany

Filed Sept. 16, 1969, Ser. No. 858,315

Claims priority, application Germany, June 13, 1969, P 17 81 296.3

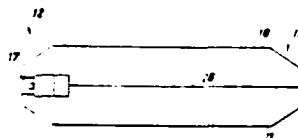
Int. Cl. B63b 35/30

U.S. Cl. 114-29

10 Claims

A hopper barge with a driving and control means supporting platform mounted thereon for constant horizontal orientation in any position of the barge sections. A hopper barge arranged with lengthwise hinged sections for opening and closing thereof is provided with a deck-mounted platform for the support of drive, steering and other control mechanism. Linkages are arranged between the platform and the adjacent portions of the barge deck so that the platform remains in horizontal orientation at all times regardless of whether the barge sections are in closed or open relationship with respect to each other. Further, the linkage systems used are mounted pivotally but nontranslatably with respect to each section of the barge and the platform, or other supported means, is likewise mounted pivotally but substantially nontranslatably with respect to the barge sections whereby, regardless of the open or closed relationship of the barge sections with respect to each other, the platform for the engine, steering or other control mechanism remains at least substantially centered at all times over the centerline of the barge.

Keywords: Hopper barge



3,648,642

**COMMUNICATION CHANNEL BETWEEN BOAT AND
MARINE CABLE DEPTH CONTROLLERS**

John W. Fetrow, and Kim L. Mitchell, both of Ponca City,
Okla., assignors to Continental Oil Company, Ponca City,
Okla.

Filed Jan. 28, 1970, Ser. No. 6,613

Int. Cl. B63b 21/00; H04b 13/02

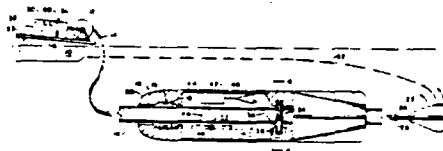
U.S. Cl. 114—235 B

9 Claims

Method and apparatus for communicating between a ship and a seismic cable depth controlling apparatus which is attached to a seismic cable for the purpose of maintaining the seismic cable at a constant or predetermined depth which essentially comprises a generator on board ship applying a predetermined AC signal to a conductor along the length of the seismic cable. A toroidal core is clamped around the seismic cable and intercepts the current passing down the cable and converts the intercepted flux to an electrical signal which is applied to the control system of the cable depth controller.

Keywords: Seismic streamer cable; Towed body depth control

U.S. Cl. X.R. 340-7



MARCH 21, 1972

3,650,238

**SYSTEM OF WATERBORNE UNITS FOR DREDGING
PURPOSES**

Geoffrey Stockdale, 57 Greenleaf Road, Wallasey, England
Filed Feb. 13, 1970, Ser. No. 11,081

Claims priority, application Great Britain, Feb. 13, 1969,
7,797/69

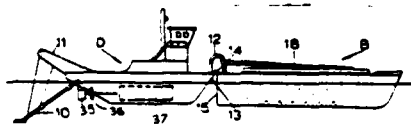
Int. Cl. B63b 21/00

U.S. Cl. 114—235 R

3 Claims

The invention provides a system of waterborne units for dredging purposes and comprises a dredger unit consisting of a relatively small self-powered vessel having normal ship form but with the forepart squared-off above the water-line, a stern propulsion and navigating unit the forepart whereof terminates at a flat bulkhead, and at least two hopper bow units the aft ends whereof terminate at flat sterns or bulkheads. The dredger unit and either of the two hopper bow units may be coupled and navigated for dredging operations, and the stern propulsion unit and either of the hopper bow units may be coupled and navigated as a unitary vessel for the rapid disposal of spoil. Box type hopper barges may be provided for interposing between the above referred to navigable arrangements of units.

Keywords: Dredge, suction; Dredge-spoil transport; Hopper barge



3,650,335
**APPARATUS FOR DRIVING AND/OR EXTRACTING
 PILES**

Norman Lee, Coventry, and Francis Benjamin Levetus,
 Abingdon, both of England, assignors to Keelavite Hydraul-
 ics Limited, Allesley, Coventry, Warwickshire, England
 Filed Oct. 8, 1969, Ser. No. 864,781
 Claims priority, application Great Britain, Oct. 11, 1968,
 48,337/68

Int. Cl. E02d 7/00

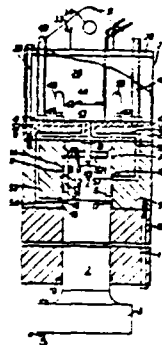
U.S. Cl. 173-91

6 Claims

A method and apparatus for the vibratory driving of piles in which a hydraulic cylinder-and-ram assembly is arranged to impart a vibration of asymmetric waveform to the pile. The apparatus includes a closed-loop servo control system by which the movement of the ram relative to the cylinder is according to an input signal of the desired waveform.

Keywords: Pile driver, vibratory; Pile extractor

U.S. Cl. X.R. 91-40; 173-125



3,650,406
OIL COLLECTION RETRIEVAL SYSTEM
 Louis Stanislaus Brown; Frank Adams March, both of
 Reston; Richard Patten Bishop, Vienna, and Bruce Calvin
 Gilman, Annandale, all of Va., assignors to Ocean Systems,
 Inc., New York, N.Y.

Filed Oct. 12, 1970, Ser. No. 80,044

Int. Cl. C02b 9/02

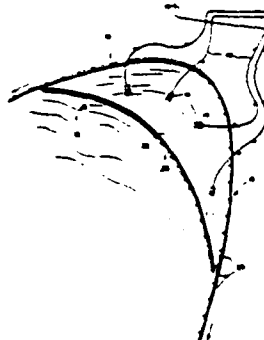
U.S. Cl. 210-242

9 Claims

A system for collecting and retrieving a liquid of low density from the surface of a body of liquid of higher density which includes a catch basin having a floating weir as one section thereof through which the lower density liquid flows, and means for retrieving the liquid from the interior of the basin. The floating weir consists of a buoyant upper section and a water absorbent lower section representing the ballast for the upper section.

Keywords: Pollutant collection; Pollutant, suction removal; Pollutant, surface barrier

U.S. Cl. X.R. 210-DIG.21



3,650,415
ARRANGEMENT FOR UNLOADING MATERIAL FROM
A DREDGE

Alfred Krumrey, Rheinhausen, Germany, assignor to Fried.
Krupp Gesellschaft mit beschränkter Haftung, Essen, Ger-
many

Filed Mar. 2, 1970, Ser. No. 15,805

Claims priority, application Germany, Feb. 28, 1969, P 19 10
242.2

Int. Cl. B65g 65/28

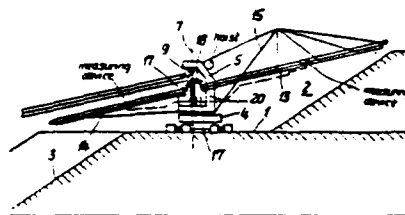
U.S. CL 214-10

9 Claims

An arrangement for dumping dredged material on an elevated bank and a below grade bank by means of a removing device, the superstructure of which is mounted on the understructure so as to be tiltable about a vertical axis and which receives the dredged material through the intervention of a belt bridge in close vicinity of the vertical pivot axis, the superstructure comprising two dumping beams for the dumping on an elevated and a below grade bank, which dumping beams are pivotable together with the superstructure, while below the discharge end of the belt bridge there is provided an adjusting device for the two dumping beams for varying the material to be dumped thereby

Keywords: Dredge-spoil transport

U.S. Cl. X.R. 198-40; 198-100



MARCH 28, 1972

3,651,646
PNEUMATIC BARRIER SYSTEM FOR WATER
SURFACES

Heinz Grunau, Lubeck, Germany, assignor to Rudolf Harm-
storf, Hamburg, Germany

Filed May 21, 1970, Ser. No. 39,262

Int. Cl. B01d 23/00

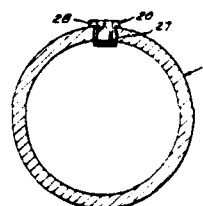
U.S. CL 61-1 R

3 Claims

A system for the confinement of pollutants on water surfaces until collected or chemically dispersed. The system effects its confining action by generating a curtain or barrier of air bubbles which at the surface of the water form a series of overlapping aerated water hills capable of blocking the passage of a pollutant, such as oil film, therethrough. The system is designed to enable it to provide a continuous barrier of aerated water hills over long period of use and even though it may be installed on harbor and waterway bottoms where silty conditions prevail. This is accomplished by a pipe for supplying compressed gas to an outlet comprising a nozzle plate having an orifice of a size to allow a metered amount of air to pass with a check valve located downstream of the nozzle plate.

Keywords: Pollutant, surface barrier

U.S. Cl. X.R. 61-6; 210-170; 210-221



3,651,647

OIL SLICK CONFINEMENT EQUIPMENT

Edmond Flaviani, 719 28th Avenue, San Francisco, Calif.
Filed Sept. 17, 1970, Ser. No. 73,001
Int. Cl. E02b 15/04

U.S. Cl. 61-1 F

5 Claims

The disclosure relates to a device for confining pollution material floating on the surface of water to a given area for subsequent collection, storage or other disposition thereof. The device comprises a variable group of individual water-tight floatable barrels rising above the water and affording a barrier against the escape of the pollution material from the area, together with universal joints connecting adjacent barrels of the group to one another and serving to allow the individual barrels to pitch and roll in accordance with the pitch and roll of the water upon which the barrels are floated and thus to maintain the barrier operative despite undue water movement.

Keywords: Pollutant, surface barrier



3,651,653

SECTIONAL PILE AND COUPLING MEANS

William J. Mouton, Jr., New Orleans, La., assignor to Charles A. Kronlage, Jr. and Gerard J. Gillen, Jr., New Orleans, La., part interest to each

Filed June 12, 1970, Ser. No. 45,644
Int. Cl. E02d 5/22; F16b 7/00, 9/00

U.S. Cl. 61-53

12 Claims

A coupling means for interconnecting the several sections of a sectional pile structure which includes tubes of deformable material embedded in and opening through the adjacent ends of the pile sections, and elongated connectors also of deformable material having bifurcated end portions for reception in the respective tubes. Wedges operatively associated with these end portions engage abutment within the tubes to separate the furcations, forcing them outwardly into expanding engagement with the tube to locally expand the latter and thereby to provide an interlock between each tube and the connector. Concurrently with the local expansion of each tube in a given direction transversely to its length, there occurs a compensating contraction thereof in a direction transverse to its expansion whereby to relieve stress and to minimize the likelihood of splitting the tube, while at the same time, interlocking the tube and connector against relative angular movement.

Keywords: Pile, concrete; Pile section connection

U.S. Cl. X.R. 61-56; 287-124; 287-20.3; 287-124



3,651,873

IMPACTING APPARATUS FOR DRIVING CONVERTIBLE TO PULLING

Philipp Uebel; Helmut Heckner, both of Munich, and Gotthilf Schullin, Fellbach, all of Germany, assignors to Wacker-Werke KG, Munich, Germany

Filed Jan. 26, 1970, Ser. No. 5,673
Int. Cl. E02d 7/06

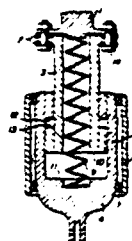
U.S. Cl. 173-29

32 Claims

An apparatus for driving and pulling objects such as poles, planks, boardings, and pipes, in which hammer means reciprocated by actuating means are slidably arranged in a holding body, said holding body being provided with a bottom surface and an axially spaced higher shoulder means while said hammer means has a head portion reciprocable between said bottom surface and said shoulder means, spring means selectively being insertable between said actuating means and said bottom surface for selectively converting the apparatus from a driving device to a pulling device.

Keywords: Pile driver, impact; Pile extractor

U.S. Cl. X.R. 173-91; 173-119



3,651,943

POLLUTION SUCTION WATER SWEEPER

James Di Perna, 85 Foxhill Terrace, Staten Island, N.Y.

Filed Apr. 13, 1970, Ser. No. 27,653

Int. Cl. C02b 9/02

U.S. Cl. 210-242

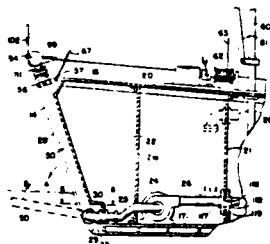
1 Claim

A floating power operated vessel designed to collect by suction from the surface of a body of water, as it moves thereover, floating pollutant matter. Adjacent the prow of the vessel is a suction pump compartment and inlet pipes below the water level connected to a suction pump in the compartment. Adjacent the stern of the vessel is a clean water collecting compartment having a discharge pipe adjacent the top thereof and above the water level for discharging the same downwardly onto the surface of the body of water. Between the forward pump compartment and the rear clear water collecting compartment there is provided a series of transversely disposed and longitudinally spaced partitions forming communicating chambers designed to separate by degrees the mass of pollutant matter from the water.

At least one suction swing pipe is pivotally jointed at the prow of the vessel. Formed in the prow is a recess in which the swing pipe is received when raised to its inoperative position. A winch and derrick on the top deck of the vessel is cable connected to the upper free end of the swing pipe. A scoop structure which may be one of a variety of forms and sizes is attached to the upper free end of the swing pipe. The scoop structures are each provided with a forwardly extending blade arranged to lie flat substantially at the surface level of the body of water. Optionally the free end of the swing pipe may be provided with a dredging nozzle and the swing pipe lowered such that the vessel may be converted into a hydraulic suction dredge.

Keywords: Dredge, suction; Pollutant removal watercraft; Pollutant, suction removal

U.S. Cl. X.R. 37-58



3,652,439

APPARATUS FOR MEASURING PH IN HIGH-PRESSURE ENVIRONMENTS

Shmuel Ben-Yaakov, Beverly Hills, and Isaac R. Kaplan, Sherman Oaks, both of Calif., assignors to The Regents of the University of California

Filed Feb. 28, 1969, Ser. No. 803,173

Int. Cl. G01n 27/30, 27/36

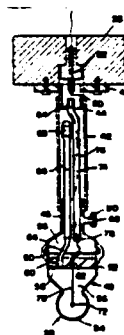
U.S. Cl. 204-195

8 Claims

Continuous direct measurement of pH at great depths in the ocean from a surface vessel is accomplished by a cable-supported probe which measures the electric potential between an Ag/AgCl/glass membrane electrode and an Ag/AgCl reference electrode immersed in a reference solution in contact with the sea water; converts the measured potential into a variable-frequency signal in situ; and transmits the signal to readout equipment at the surface. The ruggedness and simplicity which make the device suitable for routine field use at great depths are achieved by pressure equalization in the electrode structures through membrane arrangements while maintaining high electrode insulation levels; by a simplified method of electrode preparation; by remote switching and calibrating of the pH sensor and associated temperature and pressure sensors; and by a simplified analog-to-frequency converter.

Keywords: Salinity measurement

U.S. Cl. X.R. 117-113; 117-231; 174-74R; 204-279; 204-286; 321-60



APRIL 4, 1972

3,653,213

PLASTIC OIL BARRIER

Thomas W. Childers, Woodland Hills, Calif., assignor to Esso Production Research Company

Filed Apr. 22, 1970, Ser. No. 30,697

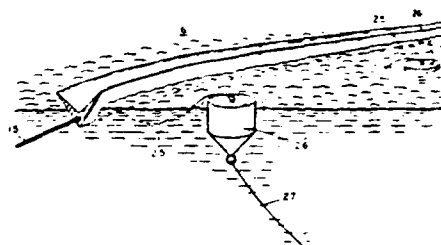
Int. Cl. E02b 15/04

U.S. Cl. 61-1 F

6 Claims

A floatable plastic barrier, molded on-site in a desired shape and secured to an elongated flexible member, is used to contain oil spills in water locations. The flexible member is a cable to which the barrier is bonded directly or attached by clips as the barrier and cable are fed onto the water. The plastic barrier is preferably molded to a 90° "V" shape with the cable formed in or attached to the vertex of the Vee. Vertical drain holes may be punched or drilled at intervals along the length of the barrier to prevent splash from accumulating in the Vee. Mooring lines are attached to the barrier as needed.

Keywords: Pollutant, surface barrier



3,653,214

OIL FILM CONTAINMENT APPARATUS

Lemuel D. Woody, Jr., Houston, Tex., assignor to Esso Production Research Company

Filed May 21, 1970, Ser. No. 41,232

Int. Cl. E02b 15/04, 3/00

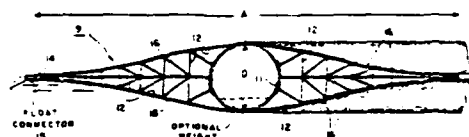
U.S. Cl. 61-1

14 Claims

A barrier apparatus for containing oil accumulation on a water surface. An elongated buoyant member having a generally triangular cross-section with such triangle preferably having slightly rounded identical sides is arranged in the water such that a line from the vertex of the triangle perpendicular to the base thereof substantially coincides with the water level. The length of such line is several wave lengths in magnitude in order to act as a dampener to wave amplitude. The length of the base of such triangle is sufficient (in cooperation with the length of the line perpendicular to the base) to inhibit or prevent oil from flowing over the barrier member and inhibit or prevent oil from becoming trapped beneath the barrier member under normal heave thereof.

Keywords: Pollutant, surface barrier

U.S. Cl. X.R. 61-5



3,653,215

METHOD AND APPARATUS FOR CONFINING AND COLLECTING OIL LEAKAGE

Arturo M. Cruet, Oklahoma City, Okla., assignor to Cerebro-Dynamics, Incorporated, Oklahoma City, Okla.

Filed June 4, 1969, Ser. No. 830,276

Int. Cl. E02b 15/04, 1/00; B03d 1/00

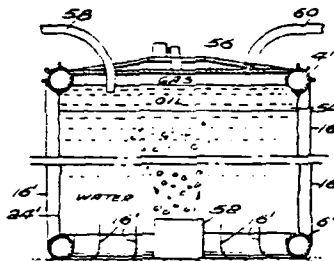
U.S. Cl. 61-1

12 Claims

An expansible oil collector and method for isolating oil escaping from an underwater source. The collector is in the form of a buoyant ring with an anchor ring suspended below the buoyant ring by cables. A thin, flexible wall or shield interconnects the anchor ring with the buoyant ring. When the collector is positioned over an underwater source of oil leakage, the anchor ring is lowered by means of the cables on the buoyant ring until the anchor ring rests on the underwater surface and encircles the source of leakage. The fluid collects at the surface of the water in the interior of the buoyant ring.

Keywords: Pollutant collection; Pollutant, submerged barrier

U.S. Cl. X.R. 61-34; 210-121; 210-242



3,653,216

METHOD AND APPARATUS FOR PREVENTING EROSION

Charles W. Stickler, Jr., Mohnton, Pa., assignor to Gray Tech Industries, Inc., Mohnton, Pa.

Filed Apr. 9, 1970, Ser. No. 26,829

Int. Cl. E02b 3/04

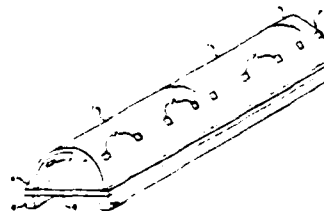
U.S. Cl. 61-4

2 Claims

This invention relates to a method and apparatus for preventing erosion of beaches by tidal waves, comprising placing hollow enclosures, such as "quonset" type huts, end-to-end along the beach, with slots on the walls of the huts, and wherein the huts are so placed that incoming tidal waves will be diverted over the roofs of the huts. Incoming and outgoing waves will be retarded in velocity by flowing through said slots and sand will be deposited and accumulated inside the huts. Reduction of wave velocity will cause deposition of sand particles as waves ride over the hut. Additionally, slots in the hut will cause incoming and outgoing waves to become retarded in velocity by flowing through said slots and sand will be deposited and accumulated inside the huts.

Keywords: Breakwater, concrete; Wave absorber beach

U.S. Cl. X.R. 61-11



3,653,218
HYDRAULIC CONSTRUCTION AND METHOD FOR
BUILDING SAME

Carl T. Cappe, Enebyberg, Sweden, assignor to Nya Asfalt
AB, Stockholm, Sweden

Filed Nov. 19, 1969, Ser. No. 878,065

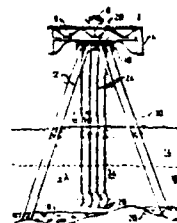
Int. Cl. E02d 21/00

U.S. CL 61-46

10 Claims

The invention relates to an improved hydraulic construction such as a quay structure, work-platform or dolphin, which is built on the bottom of the sea and comprises an above-water structure supported by supporting elements and also a method for building such constructions. The main features of the invention reside in that the construction is anchored in the bottom of the sea by means of substantially vertical prestressed elements, which are secured to anchor elements grouted under the bottom of the sea and forming a counter-balance for the tensile forces acting in the prestressed elements. This provides a stable construction which could be subjected to considerable lateral forces without losing its stability since the support elements will be subjected to compressive forces proportional to the tensile forces. The invention also provides light and simple constructions since the lateral forces acting on the construction must be resisted by big masses contained in the hydraulic construction.

Keywords: Grouting; Offshore platform, fixed; Offshore platform, leg; Pier, fixed; Pile dolphin; Seabed foundation



3,653,355
MUD ANCHOR

John A. Christians, Springfield, and Otis R. Pannell, Alexandria, both of Va., assignors to The United States of America as represented by the Secretary of the Army

Filed Aug. 6, 1970, Ser. No. 61,571

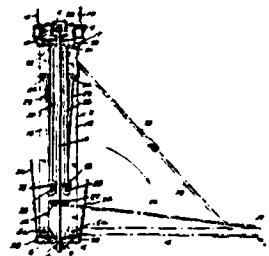
Int. Cl. B63b 21/28

U.S. CL 114-206 A

8 Claims

An explosive embedment anchor for use in mud bottoms which are too soft for efficient utilization of existing explosive embedment anchors. Anchors for this type are shot from a gun into the bed of a body of water, the anchor being the projectile. The anchor, after embedment, unfolds outward when pulled upward, much in the manner of an inverted umbrella. It consists of flukes hinged to a nose. The flukes are connected to a head by tie bars. A fabric attached to the flukes spreads out upon unfolding to hold it in the mud upon an upward pull of the head.

Keywords: Embedment anchor



3,653,460
SEISMIC ENERGY WAVESHAPE CONTROL
APPARATUS AND METHOD

Stephen V. Chelminski, West Reading, Conn., assignor to Bolt Associates, Inc., Norwalk, Conn.

Filed Nov. 14, 1969, Ser. No. 876,861

Int. Cl. G01v 1/14

U.S. Cl. 181-5 H

15 Claims

Seismic energy wave-shape control apparatus and method in which the waveshape of the acoustical waves generated in the water by the use of submerged airgun seismic sources can be controlled and selected by the survey crew to provide the waveshape which is most desirable for use under the conditions being encountered as the survey is being carried out. The pressurized gas holding charge container is provided with a plurality of chambers such that an initial abrupt flow of pressurized gas as shown at 50 in FIG. 2 occurs from a primary chamber and passes out through the discharge ports into the surrounding water with explosive-like abruptness. Delayed after-flow of pressurized gas as shown at 52 in FIG. 2 then occurs from a secondary chamber for reducing the relative magnitude and changing the waveform of the second pressure peak P2. The relative volumes of the primary and secondary chambers are conveniently changeable by detaching the casing and shifting the position of a removable barrier, thus obtaining differing waveshapes as seen by comparing FIGS. 6; 7, and 8 with FIG. 5. If desired a tertiary chamber may be utilized to provide further changes in the waveshape.

Keywords: Seismic explosive acoustic transmitter



3,653,510
OIL SKIMMING METHOD AND APPARATUS
Hugh J. Fitzgerald, Austin, Tex., assignor to Ocean Pollution Control, Inc., Dallas, Tex.

Continuation of application Ser. No. 811,713, Apr. 1, 1969, now Patent No. 3,523,611. This application Apr. 27, 1970,

Ser. No. 32,187

Int. Cl. B01d 21/00

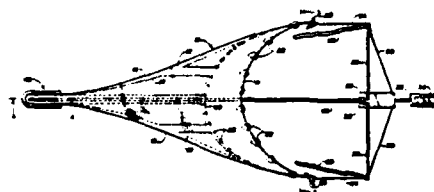
U.S. Cl. 210-83

19 Claims

Apparatus and method for skimming an oil film from the surface of a large body of water including a towed funnel assembly with a flexible cover and side skirts of impermeable sheet material with floats to keep the leading edge of the cover spaced above the surface of the water so that the oil film will pass beneath it, with the remaining portions of the cover supported on the floating oil, a bottom panel of netting to hold the side skirts in downwardly projecting position to confine the oil laterally, while permitting the water beneath it to escape freely, and a sump at the apex of the funnel to receive the oil for transfer to storage vessel.

Keywords: Pollutant collection; Pollutant removal watercraft; Pollutant, suction removal; Pollutant, surface barrier

U.S. Cl. X.R. 210-242; 210-DIG.21



APRIL 11, 1972

3,654,385

FLOATING DOCK SECTION

Byron L. Godbersen, Ida Grove, Iowa

Filed Apr. 6, 1970, Ser. No. 25,310

Int. Cl. B63b 25/00

U.S. Cl. 114—0.5 F

10 Claims

Keywords: Pier, floating; Small-craft pier

This invention relates to a floating dock section which is rigidly securable to adjacent sections. A first member extends centrally and longitudinally of the dock section and terminates proximate opposite ends of the dock section. Second members mate with the ends of the first members of adjacent sections and secure adjacent sections together. The entire dock is rigid in the water and very stable laterally as the first members distribute torque over the entire dock.



APRIL 18, 1972

3,656,342

WATER WAVE FOLLOWER

Mart Peep, and Ronald J. Flower, both of Baltimore, Md., assignors to The United States of America as represented by the Secretary of the Navy

Filed Dec. 9, 1970, Ser. No. 96,515

Int. Cl. G01w 1/00

U.S. Cl. 73—170 R

5 Claims

Keywords: Wave measurement; Wind measurement

U.S. Cl. X.R. 73-170A

A hydraulically operated, electronically controlled servomechanism wave follower to hold anemometers at fixed distances above the water surface to measure the wind field close to the surface. A wave probe mounted on the wave follower senses the water level, relays this data to an electrical control network which operates on a servo valve, enabling hydraulic fluid to raise or lower the wave probe and anemometer to the desired height.



164

3,656,345
**AUTOMATIC FREE-FALL OCEANOGRAPHIC
 TEMPERATURE PROBE**

Carey Ingram, 3634 Oleander Drive, San Diego, Calif.
 Filed Oct. 23, 1970, Ser. No. 83,570
 Int. Cl. G01w 1/00

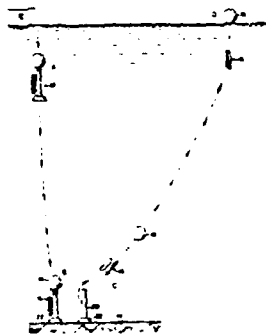
U.S. Cl. 73-170 R

10 Claims

An oceanographic temperature probe which can be jettisoned from vessels at sea for free-fall descent to a desired water depth on the ocean floor. After a predetermined lapse of time a float is released from a disposable stand which causes the operation of a reversing thermometer and its return to the surface with the float for recovery.

Keywords: Bathythermograph; Instrument deployment; Instrument retrieval

U.S. Cl. X.R. 73-343R



3,656,449
PROPELLING MEANS FOR A DREDGE

Herbert W. Mead, Springport, Mich.
 Filed June 1, 1970, Ser. No. 42,311
 Int. Cl. B63h-2/156; B63h 15/00

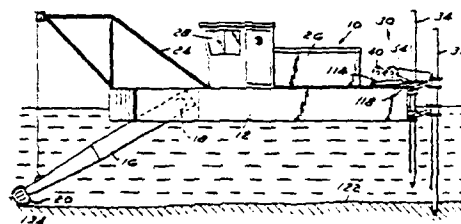
U.S. Cl. 115-9

8 Claims

The propelling means comprises two vertically slidable spuds mounted on the stern of a dredge. One of the spuds is a holding spud and is used to prevent drifting of the dredge when the other spud is being manipulated to propel the dredge forwardly. The other spud is a working spud and is used as an anchoring pivot point when imbedded in the bottom of a body of water to permit taking a cut. The working spud is disengaged from the bottom of a body of water after a cut has been taken and is shifted towards the stern of the dredge. It is then re-imbedded in the bottom of the body of water whereupon the holding spud is removed. Power means then cause the dredge to be propelled forwardly, pushing off from the working spud.

Keywords: Dredge, cutterhead; Dredge propulsion

U.S. Cl. X.R. 37-73



3,656,619
**APPARATUS AND METHOD FOR REMOVING
 FLOATING POLLUTANTS FROM A BODY OF WATER**
 Donald J. Ryan, 1826 N. 24th Street; Winston P. Ledet, 1812
 N. 24th Street, and James R. Colvin, 1818 N. 24th Street,
 all of Orange, Tex.

Filed Aug. 3, 1970, Ser. No. 60,287
 Int. Cl. E02b 15/04

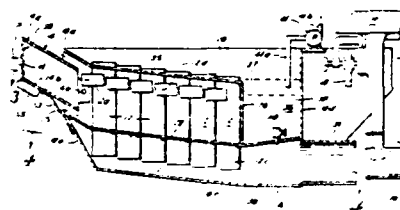
U.S. Cl. 210-83

11 Claims

Apparatus and method for removing floating pollutants such as crude oil from a body of water, wherein separator means is towed, propelled or is otherwise moved through the body of water for directing the floating pollutants with a minimum of the water through the separating means, whereby the pollutants may be rapidly removed from the body of water with substantially no mixing and emulsifying of the pollutant with the water.

Keywords: Pollutant removal watercraft;
 Pollutant, suction removal

U.S. Cl. X.R. 210-242; 210-512; 210-DIG.21



3,656,624
**APPARATUS FOR COLLECTING WASTE FROM THE
 SURFACE OF A BODY OF WATER**
 James F. Walton, 129 Front Street, Marblehead, Mass.
 Filed Dec. 12, 1969, Ser. No. 884,510
 Int. Cl. E02b 15/04

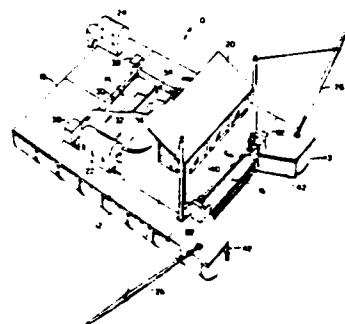
U.S. Cl. 210-242

21 Claims

A waste collecting vessel including an impeller assembly comprising a cylindrical support and a plurality of flexible, circumferentially supported blades extending longitudinally of and radially extending from the support, the diameter of the support being greater than the height of each blade. Preferably, the blades are individually mounted and the vessel includes a lip member for folding the blades when the support is rotated in one direction, a skimmer for engaging the blades when the support is rotated in the other direction, and a system for removing materials from the bottom of a deep well of a waste collection tank and for transporting waste from within the tank to storage tanks within support pontoons.

Keywords: Pollutant mechanical removal;
 Pollutant removal watercraft

U.S. Cl. X.R. 210-523; 210-DIG.21



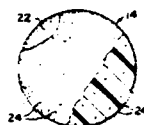
3,657,119
POLLUTION CONTROL DEVICE
 Joseph E. Turbeville, 4303 Jetton, Tampa, Fla.
 Filed May 22, 1970, Ser. No. 39,848
 Int. Cl. C02b 9/02; E02b 15/04
 U.S. Cl. 210-36

13 Claims

A system for controlling pollution of a body of water which involves the collection, containment and relocation of the pollutant such as oil from the water surface. Buoyant, water resistant ferromagnetic particles are distributed over the polluted area to adhere to the oil. A magnetic field generated via a magnetic net or parallel series of magnetic grids is then applied to collect the oil coated particles and, if desired, transport them to a more convenient area for disposal.

Keywords: Pollutant absorption; Pollutant collection; Pollutant, surface barrier

U.S. Cl. X.R. 210-40; 210-222



APRIL 25, 1972

3,657,829
DRAGHEAD WITH CONCENTRIC HOLLOW CYLINDERS HAVING ALIGNABLE PORTS
 Richard S. Lovelace, Cos Cob, Conn., assignor to National Bulk Carriers Inc., New York, N.Y.
 Continuation of application Ser. No. 514,025, Dec. 15, 1965, now abandoned. This application July 11, 1969, Ser. No. 845,932
 Int. Cl. E02f 3/92

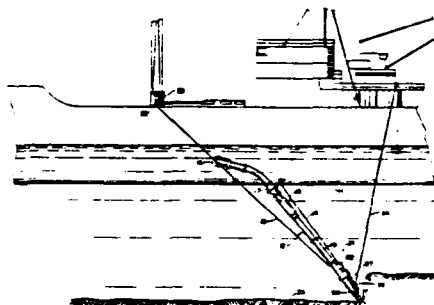
U.S. Cl. 37-63

17 Claims

A drag and draghead in which the draghead comprises concentric hollow cylinders having alignable ports, one of which being rotatable with respect to the other to change the alignment between the ports to vary the overall intake area to improve start-up characteristics and limit cavitation. A water jet arrangement is provided adjacent the intake ports to loosen the spoil and improve the intake of the drag. The drag pipe includes flexible joints and control lines to sweep it about the area to be dredged.

Keywords: Dredge, suction; Dredge intake; Dredge ladder control

U.S. Cl. X.R. 37-72; 302-15; 302-58



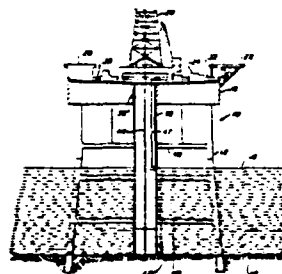
3,657,895
OFFSHORE PLATFORM
 Rex V. Pheips, Tulsa, Okla., assignor to Warren Petroleum Corporation, Tulsa, Okla.
 Filed Feb. 12, 1971, Ser. No. 114,809
 Int. Cl. E02b 17/00; C21b 15/02
 U.S. Cl. 61-46

8 Claims

A platform for offshore oil wells having a curbing around the periphery of the deck of the platform. The deck slopes downwardly from the curbing into a central opening to drain all oil spilled on the deck into the opening. A cylindrical sleeve open at its lower end to admission of water extends downwardly, preferably to the marine floor, from the opening. The diameter of the sleeve is at least as large, and preferably in the range of 20 to 50 feet, as the opening whereby all oil or other liquids draining into the opening is confined within the sleeve. The platform can be entirely of steel, steel framework mounted on a concrete substructure, or of concrete modules assembled at the well site.

Keywords: Offshore platform, fixed; Offshore storage tank, emergent; Pollutant collection; Pollutant, submerged barrier

U.S. Cl. X.R. 61-46; 175-9



3,657,896
METHOD OF CONSTRUCTING CONTINUOUS WALL BY
USE OF PILES OR PILE SHEETS AND APPARATUS
THEREFOR

Yasushi Ishihara, and Shigeru Watanabe, both of Tokyo,
Japan, assignors to Nippon Concrete Industries Company,
Ltd., Tokyo, Japan

Filed July 9, 1970, Ser. No. 53,430

Int. Cl. E02d 5/10, 7/29

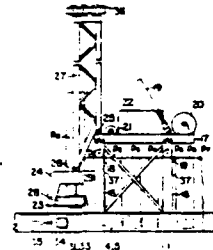
U.S. Cl. 61-53.5

7 Claims

This invention relates to a method of constructing a continuous wall by use of piles or pile sheets, which comprises fixing a construction apparatus on already installed piles or the like thereby to utilize their reaction force, and causing the construction apparatus to migrate on said installed piles or the like, and further connecting said reaction force device to a self-driving pile driver, and an apparatus therefor.

Keywords: Bulkhead; Offshore construction;
Pile driver, impact; Pile driver leads;
Pile placement

U.S. Cl. X.R. 61-58; 61-63; 173-159; 254-29



3,658,181
UNDERWATER OIL LEAKAGE COLLECTING
APPARATUS

Thomas O. Blair, 8026 S.E. Powell Boulevard, Portland,
Oreg.

Filed May 22, 1970, Ser. No. 39,928

Int. Cl. E02b 15/00, C02b 9/02

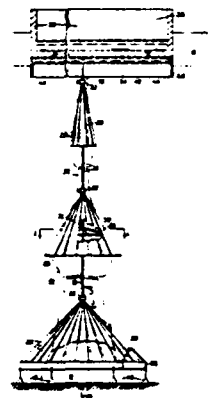
U.S. Cl. 210-170

10 Claims

A plurality of perforate cones are secured at longitudinally spaced intervals to an elongated cable. The lowermost cone is arranged over an underwater source of oil leakage and the upper end of the cable terminates at an oil collecting chamber adjacent the surface of the water. Leaking oil thus is reduced to small bubbles or streams by passage upward through the perforate cones which also direct the oil inward toward the cable, forming a column of oil which is collected at the collecting chamber.

Keywords: Pollutant collection; Pollutant,
submerged barrier

U.S. Cl. X.R. 210-242; 210-DIG.21



3,658,386

HOPPER CRAFT

Johannes Bertus Laarman, Swijndrecht, Netherlands, assignor to N. V. Industriële Handelscombinatie, Holland, Rotterdam, Netherlands

Filed Oct. 31, 1969, Ser. No. 872,973

Claims priority, application Netherlands, Nov. 1, 1968.

68.15628

Int. Cl. B65g 33/30

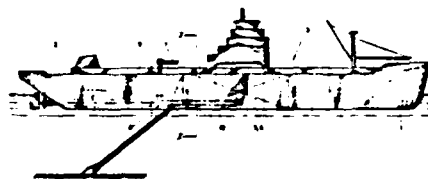
U.S. Cl. 302-15

3 Claims

A hopper craft is adapted to be loaded with relatively light material such as mud or with relatively dense material such as mixtures of sand and gravel. A central hopper is provided with air chambers on either side, and loading means selectively direct the load into the central hopper and/or the air chambers. The central hopper overflows into the air chambers and the air chambers overflow to the sea, while alternatively, the central hopper can overflow directly to the sea. The central chambers are used for any type of material but the air chambers are used only for light material.

Keywords: Dredge suction; Dredge-spoil transport; Hopper barge

U.S. Cl. X.R. 302-16; 302-28



3,659,256

HYDROPHONE STREAMER CABLE ACOUSTIC DECOUPLER

John L. Hudson, and Billy H. Towell, both of Houston, Tex., assignors to Texaco, Inc., New York, N.Y.

Filed May 18, 1970, Ser. No. 38,280

Int. Cl. G01v 1/38

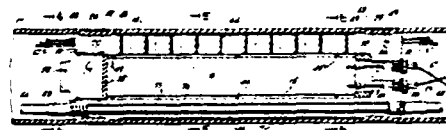
U.S. Cl. 340-7

6 Claims

The pressure sensing device in a hydrophone streamer cable is compartmentalized between a pair of clamps which are tightened after the hydrophone streamer cable is filled with floatation liquid, thus isolating the pressure sensing device from the floatation liquid outside the compartment.

Keywords: Seismic streamer cable

U.S. Cl. X.R. 340-8



3,659,257

CONTINUOUS MAGNETIC LINE HYDROPHONE

Warren E. Witzell, Woods Hole, Mass., assignor to Woods Hole Oceanographic Institution, Woods Hole, Mass.

Filed Nov. 4, 1968, Ser. No. 773,700

Int. Cl. G01v 1/16; H04r 9/00

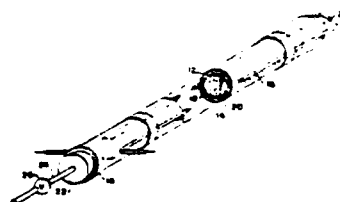
U.S. Cl. 340-8

8 Claims

A true continuous line hydrophone is constructed with an elongated resilient permanent magnet having its polar axis at right angles to the principal dimension of the line. A coil conductor is wrapped longitudinally about the magnet in such manner that laterally impinging acoustic waves alter the position of the coil relative to the magnetic field, thereby creating an electrical signal.

Keywords: Seismic hydrophone; Seismic streamer cable

U.S. Cl. X.R. 181-5R; 340-7; 340-17



MAY 2, 1972

3,659,540

MONOLITHIC FLOATING WHARVES

Kenneth L. Toby, 1551 Mount Douglas X Road, and Rodney W. S. Wells, 1329 Stanley Street, both of Victoria, British Columbia, Canada

Filed Mar. 17, 1970, Ser. No. 20,198

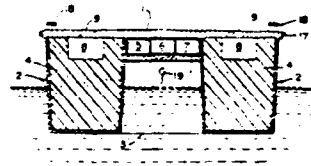
Int. Cl. B63b 35/00

U.S. Cl. 114—0.5 F

8 Claims

Monolithic reinforced concrete flotation units constructed to be assembled as single or multiple wharves with provision for the safe carriage of power, fuel and communication services and with provision for storage lockers. Such units are designed specifically for boat moorage but with modification in arrangement and assembly of the units or modification in size or shape, the units may be used for a variety of other purposes such as floating walkways or causeways, diving platforms, breakwaters, flotation units for boat moorage sheds and marine refueling stations.

Keywords: Pier, floating; Small-craft pier



3,659,545

OUTRIGGER FOR MOORING A WATER VEHICLE

John Gunnar Hedman, Pitea, Sweden, assignor to Klas O. Tellberg AB, Saltsjo-Duvnas, Sweden

Filed Feb. 12, 1970, Ser. No. 10,862

Claims priority, application Sweden, Nov. 27, 1969, 16306/69

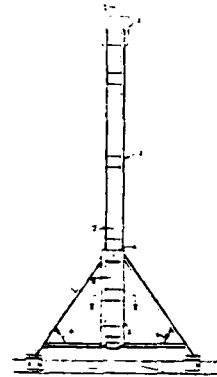
Int. Cl. B63b 21/00

U.S. Cl. 114—230

6 Claims

An outrigger for mooring water vehicles consisting of a device being pivotable or turnable in a vertical plane and connected to a quay, bridge or similar, and a boom detachably secured to said device and possibly also to the quay

Keywords: Small-craft mooring device



3,659,715

APPARATUS FOR REMOVING OIL FLOATING ON WATER

Amos J. Shaler, State College, and William E. Clancy, St. Marys, both of Pa., assignors to Stackpole Carbon Company, St. Marys, Pa.

Filed July 22, 1969, Ser. No. 843,713

Int. Cl. C02b 9/02

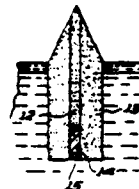
U.S. Cl. 210—242

11 Claims

An elongated porous member is impregnated with a combustible fluid and then floated in a generally upright position in a layer of combustible fluid on a body of water, with the lower portion of the porous member extending down in the water and with its upper portion projecting above the fluid layer. The fluid carried by the upper end of the porous member is ignited to produce a flame that is thereafter fed by combustible fluid moving up through that member by capillary action from the fluid layer, whereby to remove the fluid from the water and burn it.

Keywords: Pollutant burning; Pollutant absorption

U.S. Cl. X.R. 210-DIG.21



MAY 9, 1972

3,661,263

**APPARATUS FOR SEPARATING AN OIL SLICK FROM A
LARGE BODY OF WATER**

David L. Peterson, 1121 Arrowhead Rd., Anchorage, Alaska,
and Clifford M. Cole, Route 6, Box 6197, Bainbridge
Island, Wash.

Filed Nov. 17, 1969, Ser. No. 877,169
Int. Cl. C02b 9/02

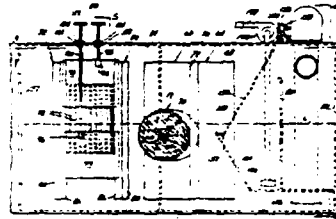
U.S. Cl. 210-242

6 Claims

A V-shaped oil slick sweeping system including a log boom
as one arm and an oil barge as the other arm, and wherein
the barge is outfitted and compartmentalized to receive
mixed water and oil, and wherein means is provided on the
barge to separate the oil from the water, and to retain the
former while discharging the latter.

Keywords: Pollutant collection; Pollutant
removal watercraft; Pollutant,
suction removal

U.S. Cl. X.R. 210-DIG.21



3,661,264

**LOG BOOM SYSTEM FOR SWEEPING OIL SLICKS
FROM A LARGE BODY OF WATER**

David L. Peterson, 1121 Arrowhead Rd., Anchorage, Alaska,
and Clifford M. Cole, Route 6, Box 6197, Bainbridge
Island, Wash.

Filed Dec. 1, 1969, Ser. No. 881,163
Int. Cl. C02b 9/02

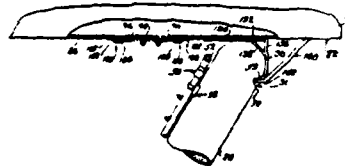
U.S. Cl. 210-242

7 Claims

A log boom for sweeping an oil slicked body of water, the
boom being formed of a buoyant material and being con-
nected in towing relationship with a suitable vessel, the boom
being provided with jet nozzles submerged below the oil
slicked surface and connected with a fluid source, water for
example, to induce a current flow on the oil slick to force the
oil slick in a direction away from the leading side of the
boom for collection in the vessel, the fluid under pressure
preventing oil slick leakage under, through or over the boom
due to the existence of currents, waves or winds.

Keywords: Pollutant collection; Pollutant
removal watercraft

U.S. Cl. X.R. 210-DIG.21



3,661,742
**ELECTROLYTIC METHOD OF MARINE FOULING
CONTROL**

Oliver Osborn, and Bernard L. Prows, both of Lake Jackson,
Tex., assignors to The Dow Chemical Company, Midland,
Mich.

Filed June 22, 1970, Ser. No. 48,523
Int. Cl. C23F 13/00

U.S. Cl. 204—147

7 Claims

An improved method of inhibiting the sustained attachment of marine organisms to metallic surfaces while preventing corrosion of the metallic surface by cathodic protection. Inhibition of marine organism attachment takes place when toxic ions are forced into solution by reversing and increasing the current density in the cathodic protection system at periodic intervals for a short period of time.

Keywords: Cathodic protection; Fouling prevention

U.S. Cl. X.R. 114-222; 204-196

No Figure

MAY 16, 1972

3,662,559
ANCHORAGE FOR BOAT DOCKS
Wesley K. Swift, 3434 19th Ave., Moline, Ill.
Filed Nov. 24, 1969, Ser. No. 879,383
Int. Cl. E02b 3/23; E02d 27/42

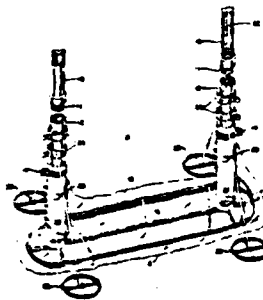
U.S. Cl. 61—46

6 Claims

This disclosure relates to an anchorage for boat docks (piers, wharves and the like) for small boats and pleasure water craft, which anchorage can be positioned and retained in position without consideration of the nature of the surface of the water bed. Further, the anchorage can be placed into position with the use of the small boat, a wrench, and a level only. This method of positioning an anchorage can be utilized to stabilize a plurality of piers and then as the base for the attachment of prefabricated members to form any desired form or design of dock or wharf. The installation of the anchorage does not require any type of pile driving to securely fasten the anchorage to the surface of the water bed.

Keywords: Pier, floating; Pile footing;
Sandbag; Seabed foundation;
Small-craft pier

U.S. Cl. X.R. 52-173; 52-295; 61-48;
61-53.6; 61-53.68



3,662,560
VALVE GUARD AND BURYING METHOD AND
APPARATUS

Anthony H. Veazey, Belle Chasse, La., assignor to Brown & Root, Inc., Houston, Tex.

Filed Apr. 3, 1970, Ser. No. 25,367

Int. Cl. F161 1/00; E021 5/02

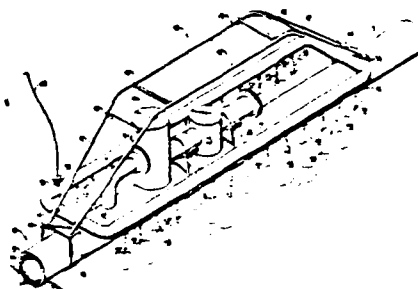
U.S. Cl. 61-72.4

8 Claims

A method and apparatus for burying an underwater pipeline section and a generally perpendicularly disposed tap-off valve into the bed of the body of water. A tubular bridge member is constructed over the tap-off valve and the valve is surrounded with a generally rectangular high pressure fluid manifold having a plurality of downwardly disposed nozzles positioned along the lateral sides thereof. The burying operation is accomplished by connecting a high pressure fluid line to the manifold and jetting away the bed surrounding the pipeline section and valve to enable the structure to descend within the waterbed.

Keywords: Seabed pipeline placement; Seabed trencher

U.S. Cl. X.R. 138-110



3,662,891
APPARATUS FOR CONFINING FLOATING MATERIALS
Edward E. Headrick, 4900 Crown Avenue, La Canada, Calif.
Filed Apr. 22, 1970, Ser. No. 30,927

Int. Cl. B01d 21/02; E02b 15/04

U.S. Cl. 210-242

12 Claims

A boom arrangement for the collection of oil or other material floating on the surface of water, the boom being suited for towed or stationary positioning. The boom comprises two flexible arms defining the sides of a converging channel and a harness located between the arms for providing the load bearing structure for supporting and maintaining the boom in proper configuration whether being drawn through the water or being used in a station keeping application. A plurality of wave attenuators may be located near the narrow end of the channel with a controllable gate linking this end of the boom and a collection device located on the side of the gate opposite the narrow end.

Keywords: Pollutant collection; Pollutant, surface barrier

U.S. Cl. X.R. 61-1P; 61-5; 210-DIG.21



3,662,892

IMMISCIBLE LIQUID SEPARATING APPARATUS

Robert M. Sorensen, Bryan, Tex., assignor to Ocean Pollution Control, Inc., Dallas, Tex.

Filed Oct. 21, 1970, Ser. No. 82,568

Int. Cl. B01d 17/02

U.S. Cl. 210-242

4 Claims

An immiscible liquid separating apparatus having an adjustable weir which admits a predominant portion of the lighter of the two liquids and a minor portion of the heavier of the two liquids into a first chamber. Liquid in the first chamber may communicate with a second chamber over another adjustable weir to permit the lighter of the two liquids to flow over the top of the second weir into the second chamber. The first chamber is provided with an aspirating slot disposed generally transversely across the bottom of the chamber to permit the heavier of the two liquids admitted to the first chamber to be withdrawn therefrom upon movement of the apparatus through the liquid body. The lighter of the two liquids collected in the second chamber may be removed by pump means disposed within the second chamber or through a line connected to the pump means positioned externally of the chamber.

Keywords: Pollutant collection; Pollutant removal watercraft

U.S. Cl. X.R. 210-DIG, 21



MAY 23, 1972

3,664,125

OFFSHORE POWER CONVERSION APPARATUS

Edward A. Strange, P.O. Box 205, Florence, Oreg.

Filed Mar. 30, 1970, Ser. No. 23,792

Int. Cl. B63h 19/02; F04b 17/00

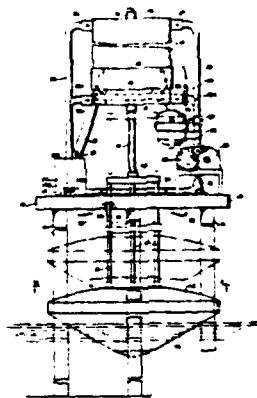
U.S. Cl. 60-51

1 Claim

An apparatus located in a body of water which has a fluctuating water level for actuation of a float assembly which is coupled to fluid displacement means. Fluid is pumped to a motor during both upward and downward movement of the float assembly with said assembly being retained against lateral movement by ground engaging supports. The motor is coupled to power conversion means, as for example a generator as shown.

Keywords: Electrical generator; Power, wave

U.S. Cl. X.R. 60-53R; 115-4



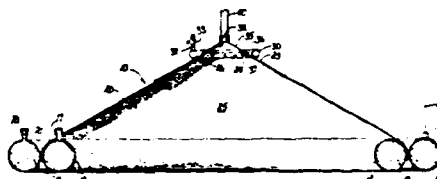
3,664,136
COLLECTING DEVICE FOR SUBMARINE OIL
LEAKAGE

Claude C. Laval, Jr., 2444 North Farris Ave., and Pete P. Peters, 1132 E. Santa Ana Ave., Both of Fresno, Calif.
Filed Nov. 28, 1969, Ser. No. 880,728
Int. Cl. E02b 3/00, 15/04; E02d 23/00
U.S. Cl. 61-1 12 Claims

A device for collecting oil leakage from formations beneath a body of water constructed of flexible, impervious sheet material for compact storage that can be readily erected for use by inflation. The device has a pair of predetermined upper and lower torus-shaped envelopes connected by a frusto-conical shroud with the lower envelope being of a larger diameter and adapted to be filled with a non-buoyant material to distend the same and to open the shroud to its frusto-conical form in circumscribing relation to a point of oil leakage. The upper envelope is relatively smaller and is adapted to be inflated with air to make it buoyant and to circumscribe an opening having a discharge conduit extended therefrom for transferring the oil leaking from the bottom of the body of water internally of the collecting device to the surface.

Keywords: Pollutant collection; Pollutant, submerged barrier

U.S. Cl. X.R. 61-69



3,664,139
REMOVABLE SELF-JETTING PILE

Richard F. Sevauer, 140 Munsey Place, Manhasset, Long Island, N.Y.
Filed Oct. 1, 1969, Ser. No. 862,684
Int. Cl. E02d 7/24, 5/60
U.S. Cl. 61-53.74 1 Claim

A removable self-jetting pile comprises a body shell, a concrete conically shaped nose portion, and a jetting tube extending from an opening in the nose portion to the upper portion of the shell. The pile is formed by setting one end of the shell in an inverted truncated cone-shaped pouring form, mounting the jetting tube in the truncated end of the form and supporting it within the shell, and pouring concrete into the shell until the pouring form and at least a lower adjacent portion of the shell are filled with the concrete.

Keywords: Concrete form, Pile, concrete; Pile driver, water jet

U.S. Cl. X.R. 61-56.5



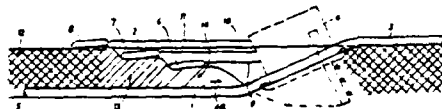
3,664,142
METHOD OF BURYING AN OBJECT IN THE SOIL

Joost Werner Jansz, Rijswijk, Netherlands, assignor to Nederlandse Maatschappij voor Werken Buitengewoon (Netherlands Offshore Company) N.V., The Hague, Netherlands
Filed Sept. 3, 1970, Ser. No. 69,236
Int. Cl. F16I 1/00; E02I 5/12
U.S. Cl. 61-72.4 3 Claims

A method of burying objects, for example pipelines and cables in the bottom of the sea includes loosening the soil, laying the object in the loosened soil and compacting the soil placed on top of the object laid by means of vibrators.

Keywords: Seabed pipeline placement; Seabed soil treatment; Seabed trencher

U.S. Cl. X.R. 61-35



3,664,429

**APPARATUS FOR PREVENTING POLLUTION FROM
OFFSHORE OIL WELLS**

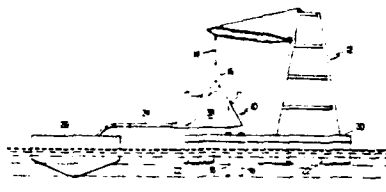
Eugene G. Jones, 2637 N. Johnson St., New Orleans, La.
Filed June 7, 1971, Ser. No. 150,430
Int. Cl. A62c 3/00

U.S. Cl. 169-2 R

8 Claims

An apparatus for catching oil from high pressure offshore oil wells so as to prevent pollution of the adjacent water. A substantially enclosed container is provided with an entrance throat area at one end of the container, and an exit at an opposite end thereof. The incoming oil from the oil wells is deflected rearwardly by a formed front wall means whereby the oil is deflected rearwardly of an upturned marginal edge of a bottom wall for the substantially enclosed container and is removed therefrom, preferably by gravity. The bottom wall ensures that no oil spills into and pollutes the adjacent water.

Keywords: Pollutant burning; Pollutant collection



3,664,438

**UNDERWATER ROCK CORE SAMPLING DEVICE AND
METHOD OF USE THEREOF**

Clifford L. Winget, Woods Hole; George W. Gibson, E. Falmouth, and William S. Shultz, Cataumet, all of Mass., assignors to The United States of America as represented by the Secretary of the Navy

Filed Aug. 26, 1970, Ser. No. 66,935
Int. Cl. E21b 3/10, 7/12, 49/02

U.S. Cl. 175-6

10 Claims

A rotary diamond rock core drill capable of obtaining a three-quarter inch diameter core four inches long at any depth down to 6,000 feet is provided. The drill is adapted to be used with manned deep submersibles and is operated by the submersible's power supply. The drive motor is encased in an oil-filled, pressure-compensated chamber. A water pump in the drill maintains a steady low pressure flow of water against the sample during drilling operations, washing away rock chips and mud. The water flow may be reversed after the core has been cut, holding the specimen within the core tube as the drill is extracted from the rock outcrop. The sample is then ejected by again reversing the drive motor and pump, forcing the water flow down through the core tube and expelling the specimen.

Keywords: Sampler, power supply; Sampler, seabed-drilled core

U.S. Cl. X.R. 175-58; 175-330



3,664,504

**METHOD AND APPARATUS FOR DEPLOYING A
FLOATABLE BARRIER**

Ray R. Ayers; Paul E. Titus, both of Houston, Tex., and James R. Hanson, Martinez, Calif., assignors to Shell Oil Company, New York, N.Y.

Filed Sept. 9, 1970, Ser. No. 70,744
Int. Cl. B01d 21/00

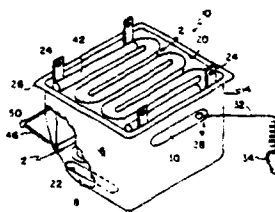
U.S. Cl. 210-83

15 Claims

Method and apparatus for deploying a floatable barrier is disclosed wherein the barrier is initially collapsed in a storage location provided by a container having means allowing escape of the barrier from the storage location upon sinking of the container and means for sinking the container. As the container is sunk, the barrier floats out of the storage location and may be deployed merely by uncollapsing the same.

Keywords: Pollutant, surface barrier

U.S. Cl. X.R. 61-1F; 210-DIG.21



3,664,505

OIL COLLECTION DEVICE

Charles J. Brittingham, 112 Wooden Bridge Road, Holland, Pa.

Filed Feb. 18, 1970, Ser. No. 12,200

Int. Cl. C02b 9/02

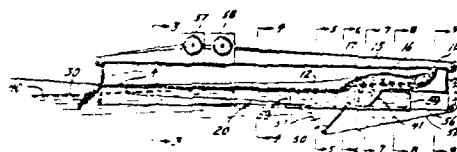
U.S. Cl. 210-242

4 Claims

Floating collection apparatus for skimming oil slicks from a body of water. The oil and water is subjected to pressure generated by the weight and movement of the apparatus to eliminate the water adjacent to and entrained in the oil film prior to sending the oil to a collection tank.

Keywords: Pollutant collection; Pollutant removal watercraft

U.S. Cl. X.R. 210-DIG, 21



3,664,781

SILT STABILIZATION DEVICE

Michael U. Widman, Columbus, Ohio, assignor to The Battelle Development Corporation, Columbus, Ohio

Filed Nov. 24, 1969, Ser. No. 879,339

Int. Cl. B29f 3/04; E02 3/12

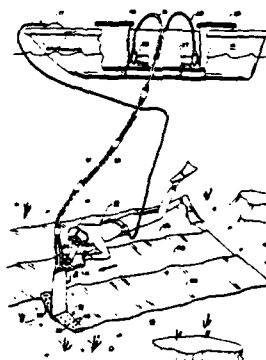
U.S. Cl. 425-68

10 Claims

The silt on the bottom of a body of water is stabilized by extruding a ribbon of a gelable material onto the silt covered bottom and simultaneously extruding one or more ribbons or streams of a gelling agent onto one or both surfaces of the ribbon of gelable material before the gelable material has dispersed or dissolved, thus providing a gelled flexible and conforming ribbon or blanket covering the bottom. A preferred apparatus for co-depositing such ribbons consists of a depending arm provided with an elongated or slit-shaped jet which is in communication with a pressurized source of a gelable material and which is positioned to extrude the gelable material in ribbon form onto the bottom. One or more slit-shaped jets in communication with a pressurized source of gelling agent is mounted to the depending arm and positioned to extrude gelling agent onto one or more surfaces of the ribbon of gelable material at the instant of its extrusion to effect its coagulation.

Keywords: Seabed material placement; Seabed soil treatment

U.S. Cl. X.R. 61-63; 264-178; 425-104; 425-113; 425-131; 425-382



MAY 30, 1972

3,665,713
CONTAMINANT CONTAINMENT METHOD AND
APPARATUS

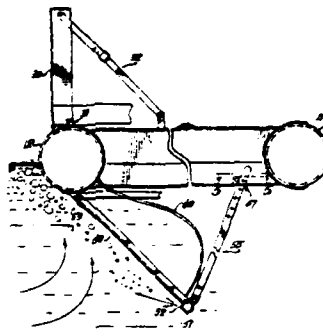
Eric Rath, P.O. Box 226, La Jolla, Calif.
Filed June 18, 1970, Ser. No. 47,455
Int. Cl. E02b 15/04

U.S. Cl. 61-1 F

1 Claim

This is a method and apparatus for containment of contaminants on fluid surfaces, particularly such as oil spillages in ocean waters, wherein the use of a floating barrier with submerged shield segments carrying high pressure jets is utilized in interconnected, segmented form.

Keywords: Pollutant, surface barrier



3,665,717
METHOD AND APPARATUS FOR INSTALLING
ELONGATED RODS IN UNSTABLE EARTH
FORMATIONS

Gerald T. Sweeney, and Oliver E. Erdman, both of Tacoma, Wash., assignors to Soil Sampling Service, Inc., Puyallup, Wash.

Filed Jan. 14, 1971, Ser. No. 106,341
Int. Cl. E02d 5/74

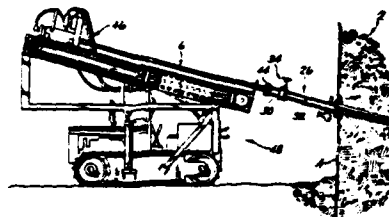
U.S. Cl. 61-39

19 Claims

The method and apparatus are an improvement on the patentee's earlier method and apparatus for installing an elongated rod in an earth formation by the steps of installing a tubular casing in a tunnel in a face of the formation, inserting the rod in the casing, and then retracting the casing from the tunnel. According to the new method, they install and retract the casing through a liquid seal adjacent the face of the formation, and charge a liquid medium into the tunnel through the seal to pressurize the tunnel about the casing, and to retain the formation about the rod when the casing is retracted from the tunnel.

Keywords: Bulkhead; Grouting

U.S. Cl. X.R. 61-53.64; 61-53.68



3,665,718
**METHOD OF FILLING A SPACE UNDER A
 STRUCTURAL ELEMENT AND STRUCTURE THEREFOR**
 Albert Griffioen, Utrecht; Jan Hofmeijer, Rijswijk; Paul Cor-
 nellis Van Milligen, Roggekamp; Jörn Yding Tonnissen,
 Oegstgeest, and Jacobus Martinus Van Zanten, Utrecht, all
 of Netherlands, assignors to Combinatie Westerschelde
 v.o.f., Utrecht, Netherlands

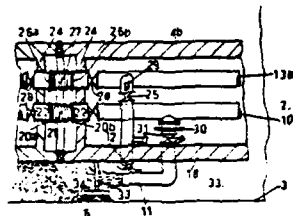
Filed July 28, 1970, Ser. No. 58,775
 Claims priority, application Netherlands, Mar. 31, 1970,
 7004556

Int. Cl. E02d 29/00; E01g 3/00
 U.S. Cl. 61-43 9 Claims

In a known method of filling a space under a structural element with sand, sand and water are supplied into said space through a suspension conduit communicating with a suction dredging installation, rolling on and guided by said structural element, extending above the water level and sucking sand from barges. This suction dredging installation obstructs the shipping and cannot be used at bad weather conditions and/or great depth. For avoiding the above disadvantages the invention provides a method in which the suspension is supplied through a suspension conduit fixed to the structural element, and extending from a junction side of said structural element.

Keywords: Seabed foundation; Seabed material placement

U.S. Cl. X.R. 61-46; 61-50



3,665,720
**METHOD OF STABILIZING SAND FOUNDATIONS
 UNDER BUILDING WORKS SUBMERGED IN WATER**
 Kaj Havn, Copenhagen, Denmark, assignor to Christani &
 Nielsen A/S, Copenhagen, Denmark
 Filed May 8, 1970, Ser. No. 35,688

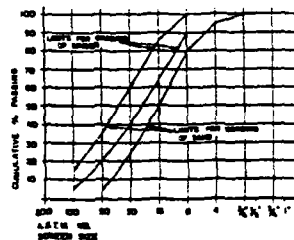
Claims priority, application Denmark, Dec. 11, 1969,
 6558/69

Int. Cl. E02d 3/12 4 Claims
 U.S. Cl. 61-46

A method of stabilizing sand foundations under building works submerged in water including pumping in sand to which a small percentage of hydraulic binder is added under the building work, utilizing a grain-size distribution of the hydraulic binder adjusted to the grain-size distribution of the sand to avoid separation of the binder from the sand, wherein the hydraulic binder, by hydration, cements the sand grains into a strong coherent conglomerate which will remain unaffected by earthquakes.

Keywords: Seabed foundation; Seabed soil treatment

U.S. Cl. X.R. 61-36; 61-50



3,665,721

SUBMERGED WELL PLATFORM

Malcolm R. J. Wyllie, Allison Park, Pa., assignor to Gulf Research & Development Company, Pittsburgh, Pa.
Filed May 27, 1970, Ser. No. 40,924
Int. Cl. E02d 27/38; B63b 35/44

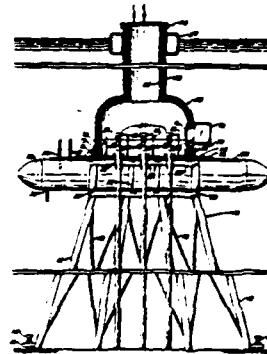
U.S. Cl. 61-46

6 Claims

A platform supports off-shore wellhead assemblies below the surface of the water at a depth adequate to eliminate danger from surface vessels or storms. Buoyancy tanks reduce the weight supported by the platform and thereby combine with the reduced weight above the ocean floor to reduce the cost of the platform. A seat is provided on the deck of the platform to receive and seal the lower end of a removable access tube that extends upwardly above the surface of the water to allow work at the wellhead to be performed at atmospheric pressure.

Keywords: Offshore platform, fixed; Offshore storage tank, submerged

U.S. Cl. X.R. 175-5; 175-9



3,666,026

DEVICE FOR GRIPPING AND ACTUATING A BORING TUBE, FOUNDATION PILE OR THE LIKE

Pierre Jean-Marie Theodore Allard, 178, Boulevard Francois Ier, 76, La Havre, France

Filed Aug. 21, 1970, Ser. No. 65,820

Claims priority, application France, Sept. 11, 1969, 6931009;
Jan. 28, 1970, 7002958

Int. Cl. E02d 7/18

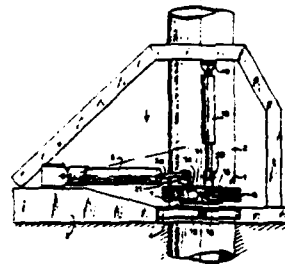
U.S. Cl. 173-152

5 Claims

A device for tightening and actuating a boring tube, and comprising a collar constituted by a first and a second chain links or sections interconnected through the medium of linking elements, the ends of said first link being secured directly to the said linking elements while the ends of said second link are adapted to be actuated respectively by traction means solid with the said linking elements, so as to ensure a uniform and accurate tightening of the collar on the tube by exerting a tractional action on both ends of said second chain link.

Keywords: Pile driver leads

U.S. Cl. X.R. 81-57.17; 81-66



3,666,098

**METHOD AND APPARATUS FOR CONFINING AND
COLLECTING AN OIL SLICK**

Charles Garland, Williamsburg; James J. Victory, and John
P. Latimer, both of Newport News, all of Va., assignors to
Deepsea Ventures, Inc., Gloucester Point, Va.
Filed Sept. 8, 1970, Ser. No. 70,142
Int. Cl. B01d 37/00

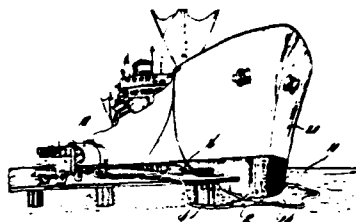
U.S. Cl. 210-83

6 Claims

Method and apparatus for confining and collecting an oil
slick upon the ocean's surface, particularly a method for
shielding the oil slick/ambient air interface during collecting
of the oil, so as to prevent ingestion of air while maintaining
flexibility of the confining and collecting boom.

Keywords: Pollutant collection; Pollutant,
suction removal; Pollutant, surface
barrier

U.S. Cl. X.R. 210-DIG.21; 210-242



3,666,100

**METHOD AND APPARATUS FOR COLLECTING OIL
FROM AN UNDERWATER LEAK**

Thaddeus A. Madej, 1223 Polk St., Hollywood, Fla.
Filed Apr. 24, 1969, Ser. No. 818,868
Int. Cl. B01d 21/00

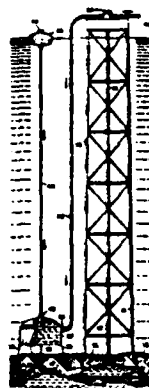
U.S. Cl. 210-83

2 Claims

A method and apparatus for collecting oil from an un-
derwater leak including the steps of (1) detecting the loca-
tion of the leak, (2) submerging an inverted collector shell
under the water to a position directly over and enclosing the
leak so that oil, being lighter than water, rises from the
source of the leak into the collector shell and displaces water
in the collector shell to partially fill the collector shell with
oil, (3) providing a conduit leading from the submerged col-
lector shell upward through the water to a pump and from a
pump to a storage receptacle, and (4) pumping oil from the
collector shell through the conduit to the storage receptacle
with said pump. Also disclosed is apparatus for carrying out
the method.

Keywords: Pollutant collection; Pollutant,
submerged barrier; Pollutant,
suction removal

U.S. Cl. X.R. 210-DIG.21; 210-242



JUNE 6, 1972

3,667,234
REDUCING AND RETARDING VOLUME AND
VELOCITY OF A LIQUID FREE-FLOWING IN ONE
DIRECTION

Gabriel V. De Lizasoain, Boca Raton, Fla., assignor to Tec-
nico, Inc., Washington, D.C.

Filed Feb. 10, 1970, Ser. No. 10,205

Int. Cl. E02b 3/00

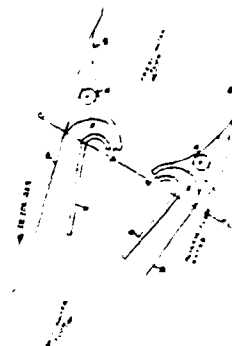
U.S. Cl. 61-1 R

4 Claims

The volume and velocity of a free flowing body of water, such as a river or the like, moving in one direction past a control point are there reduced and retarded by diverting part of the volume of water, amplifying its velocity, linearizing its flow characteristics, and directing this modified flow back into the main body of liquid at such an angle as to create in the body of the stream, at the control point area, a zone of compound flows which through turbulence, drag, and other fluid phenomena materially obstruct and retard the flow through the control area.

Keywords: Channel barrier; Tidal estuary
water quality; Tidal inlet

U.S. Cl. X.R. 61-2



3,667,235
CONVERTIBLE BARRIER FOR SUBSTANCES
FLOATING ON WATER

Paul Press, P.O. Box 1002, Toms River, N.J., and John J.
Gallagher, 251 Burley Road, Annapolis, Md.

Filed Apr. 27, 1971, Ser. No. 137,799

Int. Cl. B63b 35/00

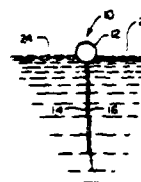
U.S. Cl. 61-1

6 Claims

A barrier for substances floating on water having a flotation member and a liquid pervious and a liquid impervious skirt depending therefrom. The liquid impervious skirt is deflected at currents greater than about one knot and the oily substances are treated with a particulate oleophilic-hydrophobic substance less dense than water for retention by said liquid pervious skirt.

Keywords: Pollutant, surface barrier

U.S. Cl. X.R. 210-242



3,667,239

ANCHOR FOR BUOYANT MARINE STRUCTURES

George E. Mott, Metairie, La., assignor to Texaco Inc., New York, N.Y.

Filed Apr. 30, 1970, Ser. No. 33,395

Int. Cl. B63b 35/44, 21/50

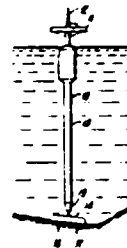
U.S. Cl. 61—46.5

10 Claims

The invention relates to a buoyant marine platform for positioning in a deep water offshore location. The platform includes buoyancy control means whereby to regulate the attitude of the unit at the water's surface as well as when submerged. The platform lower end is provided with an anchoring member adapted to seat, and be partially imbedded into a sloping or contoured ocean floor. Said anchor member comprises separate, yet cooperating components which permit adjustment of the anchor's disposition while at the ocean floor, to operably engage and fixedly position the buoyant platform.

Keywords: Grouting; Offshore construction; Offshore platform anchor

U.S. Cl. X.R. 9-80P; 114-0.5D



3,667,553

TELESCOPING SEA FLOOR SOIL SAMPLER

Henry L. Gill, Ojai, Calif., assignor to The United States of America as represented by the Secretary of the Navy

Original application Apr. 1, 1969, Ser. No. 813,403, now Patent No. 3,576,220. Divided and this application Dec. 14,

1970, Ser. No. 97,827
Int. Cl. E21b 7/12, 49/02

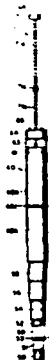
U.S. Cl. 175—6

5 Claims

A deep penetrating ocean bottom soil sampler employing a plurality of telescoping tubes that may be sequentially driven downwardly to penetrate the ocean floor a distance equal to approximately $\frac{1}{4}$ of the cumulative length of the tubes. As the sampler with extended tubes is withdrawn, it extracts an elongate core comprising a representative ocean bottom soil sample.

Keywords: Sampler, seabed-driven core

U.S. Cl. X.R. 175-20



3,667,605

SUBMERGED OIL LEAK CONTROL

Robert O. Zielinski, Route #2, Box 20, Delton, Mich.

Filed May 4, 1970, Ser. No. 34,087

Int. Cl. E02b 15/04

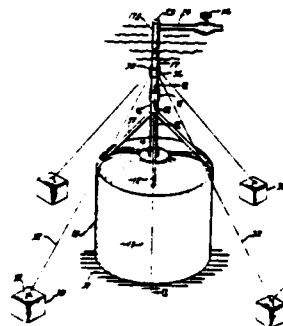
U.S. Cl. 210—170

1 Claim

Cup-shaped casing means inverted upon or adjacent to the ocean floor and tubular means extending upwardly from said casing means and communicating with the interior thereof through an opening in the top wall thereof. The tubular means is braced by a plurality of cables connected thereto and to anchor means located on the ocean floor.

Keywords: Pollutant collection; Pollutant, submerged barrier

U.S. Cl. X.R. 61-1; 61-46



3,667,873
WATER MOVING APPARATUS FOR DESTRATIFICATION, ICE REDUCTION AND BARNACLE CONTROL

Roy A. Cramer, Jr., % Anchormatic, 1020 E. 79th
 Terrace, Kansas City, Mo. 64131
 Filed Nov. 2, 1970, Ser. No. 85,898
 Int. Cl. B01f 5/12; E02b 3/00; F04b 17/00
 U.S. Cl. 417—424 9 Claims

A water moving apparatus for destratification, ice reduction and barnacle control in a body of water includes an elongated column member suitably mounted on a support and extending downwardly into a body of water and having a diffusing member, a submersible motor and an upwardly directed propeller associated with the motor, all being mounted adjacent a lower end of the column member whereby operation of the propeller and the diffusing member effect an upwardly and outwardly diffused flow in the body of water thereby moving warmer subsurface water to the surface and effecting a circulation that provides aeration thereof and decreasing stratification and more uniform temperature of the body of water and the water is moved with a velocity of flow sufficient to substantially eliminate adherence of barnacles to surfaces within the body of water.

Keywords: Fouling prevention; Ice protection

U.S. Cl. X.R. 61-1R; 259-97



3,668,118
OIL MOP AND METHOD OF USING SAME
 Herbert M. Rhodes, New Orleans, La., assignor to Oil Mop International, Inc.
 Filed July 6, 1970, Ser. No. 52,448
 Int. Cl. E02b 15/04
 U.S. Cl. 210—30 9 Claims

The present disclosure is directed to a method of removing oil from the surface of a body of water with an oil mop made of thin gauge narrow strips of polypropylene or similar material passed through the oil on the surface of water and then through wringers and/or water or chemical sprays or both to remove the oil from the mop, depositing the oil in a receptacle and returning the non-oil laden mop back into the oil covered water to pick up more surface oil.

Keywords: Pollutant absorption; Pollutant, mechanical removal

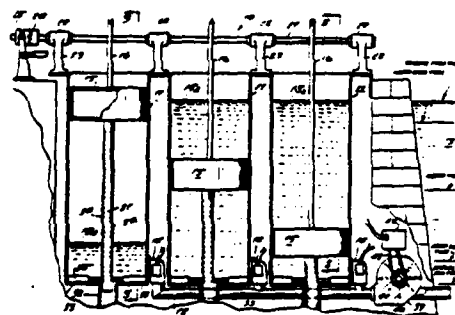
U.S. Cl. X.R. 210-40; 210-DIG.21



3,668,412
APPARATUS FOR HARNESSING THE VERTICAL MOVEMENT OF OCEAN TIDES AND UTILIZE THE FORCE FOR GENERATING ELECTRICAL ENERGY
 Charles K. Vrana, 60 Helen Lane, and Jacquelyn G. Lawton, 402 Crescent St., both of Fort Myers Beach, Fla.
 Filed Oct. 27, 1970, Ser. No. 84,412
 Int. Cl. F03b 13/12
 U.S. Cl. 290—53 3 Claims

An apparatus for harnessing the vertical movement of ocean tides and utilize the force for generating electrical energy, the apparatus being based upon the principal of a large float which exerts force upwardly at a time of a risen tide and a downward force due to gravity at a time of a fallen tide, said float is first securely captivated to the level of the prevailing low tide and which is then released at the height of the tide in order to contribute its full built up force of available energy, the vertical movements of the float being transmitted from a vertical superstructure mounted upon the float to a rotatable gear mounted upon a rotatable horizontal shaft journaled in stationary stanchions, and the rotatable shaft thus driving an electrical generator or performing other useful work.

Keywords: Electrical generator; Power, tide



JUNE 13, 1972

3,668,875

OFFSHORE TERMINAL

Otto Sander, and Alexander Ulpe, both of Duesseldorf, Germany, assignors to Mannesmann Aktiengesellschaft, Duesseldorf, Germany

Filed July 15, 1970, Ser. No. 55,200

Claims priority, application Germany, July 23, 1969, P 19 38 018.8

Int. Cl. E02b 17/02

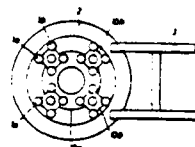
U.S. Cl. 61—46

1 Claim

An offshore terminal is constructed from tubing to establish a resiliently yielding tower. A floating platform as docking and cargo handling berth is linked to the tower by means of a floating collar through which impact forces acting on the platform are reacted into the tower. Different embodiments include single pipe and plural pipe tower constructions as well as outrigger-like platforms and platforms traversed by the tower.

Keywords: Offshore mooring structure; Offshore platform, fixed; Offshore platform, leg

U.S. Cl. X.R. 114-230; 137-236



3,668,876

OFFSHORE TOWER APPARATUS AND METHOD

Albert M. Koehler, Houston, Tex., assignor to Brown & Root, Inc., Houston, Tex.

Filed Apr. 20, 1970, Ser. No. 30,098

Int. Cl. E02b 17/00; E02d 21/00; E04h 12/08

U.S. Cl. 61—46.5

20 Claims

A tower suitable for use in offshore well operations and the like including a plurality of sloping jacket legs extending from the bed of the body of water to a position above the surface of the body of water for supporting a platform thereupon. The jacket legs are reinforced by a surrounding shell of diamond patterned cross braces and a plurality of girder rings lying in a plurality of planes normally with the central axis of the tower. The girder rings are supported against deformity by a bicycle spoke reinforcing system at each girder ring level.

The method aspects of the invention include constructing the tower in a generally horizontal posture upon a plurality of generally upright columns. The construction steps include forming a plurality of girder rings and erecting the girder rings upon the columns. Jacket legs are connected between adjacent girder rings along the length of the offshore tower and the tower legs are enclosed within an outer shell of cross bracings. The offshore tower, following construction, is launched into a body of water for transportation to a selected marine site by constructing the tower longitudinally upon a rail having one end thereof lying adjacent a sheet pile wall which permits the lower end of the rail to be positioned below the adjacent water level. A floatation system connected to the tower and the wall is removed to permit the base of the tower to be buoyantly lifted from the construction support. The upper portion of the tower rests upon a rail bearing guide bracket which is initially positioned above the water level. The rail bearing guide bracket may be lifted off the rail by an incompressible fluid and the tower slides into the body of water. Alternatively, the tower may be jacked into the water by conventional jacking devices. Upon being erected at an offshore location, conductors may serve in a dual capacity as conductors and piles, or piles may be inserted into skirt pile casings surrounding the base of the tower and driven into the bed of the body of water by a stinger guided by a rotating truss.

Keywords: Offshore platform, fixed; Seabed foundation

U.S. Cl. X.R. 114-230; 137-236



3,668,877

PILE SECTION FOR FORMING A PILOT HOLE

Gabriel Fuentes, Jr., 1501 Ashford Avenue, Santurce, P.R.
Original application Nov. 20, 1967, Ser. No. 684,297, now
Patent No. 3,522,707, which is a continuation-in-part of
application Ser. No. 609,102, Jan. 13, 1967, now Patent No.
3,449,958. Divided and this application Feb. 2, 1970, Ser. No.
12,492

Int. Cl. E02d 5/22; E21b 11/00

U.S. Cl. 61-53

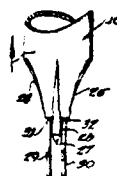
3 Claims

This invention relates to apparatus for driving a concrete piling formed of a number of concrete pile sections which are spliced together to form a piling of a predetermined length including a dummy pile for providing a pilot hole, special pile sections for hard or other special driving conditions, and a sleeve for splicing the pile sections together.

The same technique is applied to forming retaining walls, bulkheads and even to light poles, telephone poles and the like, in which case, the poles are easily repaired or replaced if damaged.

Keywords: Pile-driving shoe; Pile, steel

U.S. Cl. X.R. 61-53.68; 175-19



3,669,052

**METHOD AND APPARATUS FOR PREVENTING ICE
DAMAGE TO MARINE STRUCTURES**

Joseph F. Schirtzinger, Pasadena, Calif., assignor to Air Logistics Corp., Pasadena, Calif.

Filed June 15, 1970, Ser. No. 46,273

Int. Cl. B63b 35/08

U.S. Cl. 114-0.5 R

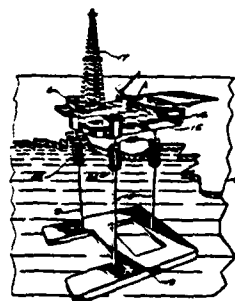
13 Claims

A marine well drilling platform or the like having legs extending to the sea floor is protected from ice floes by comminuting devices at the water line for breaking the ice and thereby preventing crushing or overturning of the platform. The comminuting devices employ high velocity impacts against the ice to cause its fracture into chips as distinguished from cutting action. Rapidly rotating or reciprocating mechanisms with large "teeth" for making impact engagement with the ice are employed in separate embodiments. Comminuting devices mounted for sweeping adjacent a mooring buoy in one embodiment open a path through an ice floe for protecting the buoy and a ship moored at the buoy.

Keywords: Ice protection; Offshore mooring structure; Offshore platform, fixed; Offshore structure fender

U.S. Cl. X.R. 9-8R; 61-1; 61-46; 114-42; 299-26

See: Re. 28,332



3,669,140

SUCTION DREDGING INSTALLATION

Romke van der Veen, Jutphaas, Netherlands, assignor to N.V. Ingenieursbureau Voor Systemen En Octrooien Spanstaal, Rotterdam, Netherlands

Continuation of application Ser. No. 817,719, Apr. 21, 1969, now abandoned. This application Feb. 16, 1971, Ser. No. 115,816

Int. Cl. F16k 49/00

U.S. Cl. 137-334

8 Claims

Suction dredging installation is provided comprising a convey pipe for conveying a suspension of dredging spoil and water, said convey pipe being provided with at least one pump;

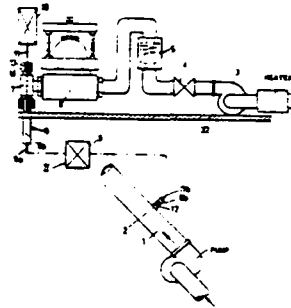
a purgative source connected by means of a purgative conduit to at least one measuring point;

at least one pressure sensitive element connected by means of a tactile conduit with said purgative conduit

The suction dredging installation is characterized in that the tactile conduit is mounted for a considerable part of its length in the purgative conduit of said measuring point, resulting in a simplification of assembling the conduits, and a protection against damage and an insulation against excessive cooling of the tactile conduit.

Keywords: Dredge-spoil transport; Dredge, suction

U.S. Cl. X.R. 37-58



3,669,198

FLUID OPERATED DROP HAMMER WITH VALVED PISTON

Roger M. Elliott, Somersham, near Ipswich, England, assignor to The British Steel Piling Company Limited, Claydon, Ipswich, Suffolk, England

Filed Mar. 10, 1970, Ser. No. 18,239

Claims priority, application Great Britain, Mar. 11, 1969, 12,814/69

Int. Cl. E02d 7/10; F01l 21/04

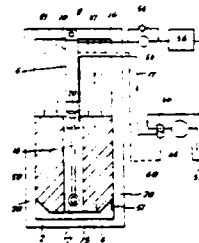
U.S. Cl. 173-127

10 Claims

A drop hammer has an operating ram in which valve-controlled conduit means interconnect opposite ends of a cylinder of the ram to allow fluid to transfer between the ends of the cylinder.

Keywords: File driver, impact

U.S. Cl. X.R. 91-224; 91-318



3,669,275

APPARATUS FOR REMOVING OIL FROM WATER

Ned E. Downs, Raleigh, N.C., assignor to Hercules Incorporated, Wilmington, Del.

Filed Nov. 4, 1970, Ser. No. 86,782

Int. Cl. E02b 15/04

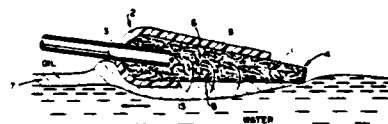
U.S. Cl. 210-242

3 Claims

Improved equipment for removing oil from the surface of a body of water is disclosed. To a previously known apparatus comprised of an oleophilic fibrous batt having one or more perforated pipes embedded in it for taking away adsorbed oil, there is added a flexible shield covering the area where the pipe or pipes are located. The shield prevents water from entering into the area of the pipes and being pumped off with the oil.

Keywords: Pollutant absorption; Pollutant, suction removal

U.S. Cl. X.R. 210-460; 210-DIG.21



3,669,540
OPTICAL DEPTH FINDER AND
ELEMENTS THEREFOR

William J. Rattman, Needham, Frank R. Wasson, Jr.,
Cheimsford, and Gordon C. MacKenzie, North
Billerica, Mass., assignors to Raytheon Company, Lex-
ington, Mass.

Filed Aug. 31, 1970, Ser. No. 68,206

Int. Cl. G01c 3/08; G02b 27/28

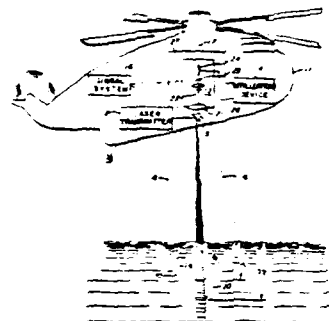
U.S. Cl. 356-4

7 Claims

An improved optical depth finder, and elements there-
for, for depth sounding and detection of submerged targets
from an airborne vehicle. The disclosed system uses a
coherent beam of polarized light from a laser directed
downwardly toward the surface of a body of water and
processes the polarized surface specular reflected energy,
energy reflected by submerged targets within the beam,
and energy reflected by the bottom of the body of water
to derive the desired information. Means are provided
selectively to attenuate the reflected energy in accordance
with the particular source thereof so as to permit the
dynamic range of the processor of the reflected energy
to be reduced and the system to be used when the height
of the airborne vehicle changes or condition of the water
varies.

Keywords: Instrument, airborne; Instrument,
laser; Sonar, depth sounder

U.S. Cl. X.R. 350-153; 350-314; 356-3;
356-5; 356-119



JUNE 20, 1972

3,670,504
FABRIC CONTAINMENT CONSTRUCTIONS

John T. Hayes, Durham, and Robert G. Currier, Roxboro,
both of N.C., assignors to Collins and Aikman Corporation,
New York, N.Y.

Filed Feb. 5, 1968, Ser. No. 702,925

Int. Cl. E02b 3/04

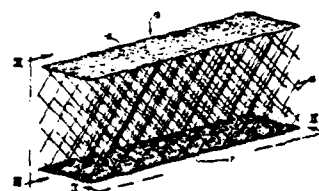
U.S. Cl. 61-3

4 Claims

A dual-wall fabric is provided, with integrally woven drop
stitches connecting opposite walls thereof, the fabric being
adapted to receive a filler material between walls thereof, the
filler material being preferably cast therein, such as concrete,
and the fabric walls being of desired materials and weaves to
yield desired porosities. One or both of the walls may be con-
structed of a material having a specific gravity less than water,
to facilitate floating of the same in water. Prior to filling the
dual-wall fabric with concrete or the like, reinforcing rods
may be interspersed between the connecting drop stitches.
The dual-wall fabric, or a single-wall fabric may be anchored
along beaches, canals and the like, into canopy-like configura-
tions or structures, which structures may be filled with sand or
other natural fill, the mound or sand bar thus formed being
then covered by a concrete-like material. In the case of a dual-
wall fabric construction, concrete may be pumped between
the fabric walls, to provide a concrete-like outer encasement
for the sand bar or the like thus formed.

Keywords: Bar protection; Breakwater, concrete;
Concrete form; Fabric mac; Offshore
construction

U.S. Cl. X.R. 61-5; 61-37



3,670,514

AUTOMATIC SUBMARINE TRENCHER

Michael P. Breston, and Ray D. Keilberg, both of Houston, Tex., assignors to Fluor Corporation, Los Angeles, Calif.
Filed Sept. 4, 1970, Ser. No. 69,566
Int. Cl. E02f 5/08, 15/11, 1/00

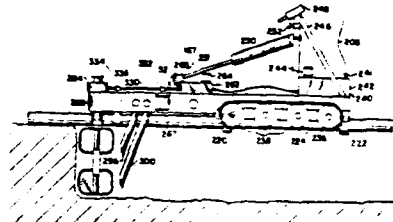
U.S. Cl. 61-72.4

21 Claims

An automatic trencher is provided for entrenching a pipeline in the bed of a body of water. The trencher is adapted to ride over the pipeline and includes one or more trenching tools which cut away the formation of the bed to form a single trench therein for receiving and burying the pipeline. Power and control signals are supplied by a flexible cable coupling the trencher with an accompanying overhead manne vessel. This power is used to move the trenching tools, to advance the trencher along the path of the pipeline as the trench is being formed, and to energize surveillance apparatus. Depending on the type of soil, tools of various configurations can readily be interchanged while the trencher is submerged. Piston-type hydraulic pump-motor combinations rotate the tools and propel the trencher along the desired path. Means responsive to the fluid pressure in the pumps automatically maintain the power output at the tools substantially constant within a wide range of load variations, thereby greatly increasing both the efficiency of the tools and the speed of the trenching operation.

Keywords: Seabed pipeline placement; Seabed trencher

U.S. Cl. X.R. 37-94; 37-102



3,670,572

AIR-SEA INTERFACE TEMPERATURE MEASURING APPARATUS

Robert F. Devereux, Oxon Hill, Md., and Ernest L. Casco, San Diego, Calif., assignors to The United States of America as represented by the Secretary of the Navy
Filed June 11, 1971, Ser. No. 152,141
Int. Cl. G01k 1/14

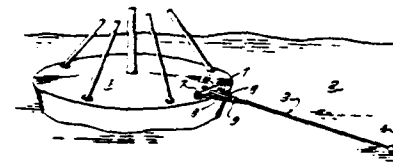
U.S. Cl. 73-342

9 Claims

Vertical distribution of temperature at the sea surface is measured by an array of temperature sensors extending upwardly and downwardly from a small float. The float is carried at the outboard end of a relatively long outrigger member which itself is pivotally carried by a buoy or ship so as to be in a free-swinging disposition capable of floatably riding the undulating sea surface to maintain the sensors at fixed positions relative to the surface both in the air and submerged.

Keywords: Bathythermograph; Buoy, instrumented; Instrument deployment

U.S. Cl. X.R. 73-170A; 73-170R; 73-353



3,670,839

EXTENDED AREA ACOUSTIC IMPULSE GENERATOR

Carl H. Savit, Houston, Tex., assignor to Western Geophysical Company of America, Houston, Tex.
Filed July 23, 1969, Ser. No. 844,152
Int. Cl. G01v 1/02

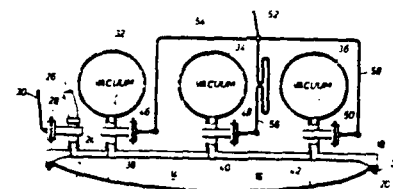
U.S. Cl. 181-0.5 H

1 Claim

An acoustic impulse generator for producing in a liquid body acoustic impulses useful, for example, in geophysical explorations. The generator includes a housing which defines an enclosed chamber having a flexible wall. Driving means in one operating condition cause the flexible wall to execute a forward stroke in the liquid body thereby storing potential energy in the liquid body. The driving means in another operating condition allow the flexible wall to execute a return stroke in a relatively short time interval thereby generating an acoustic impulse.

Keywords: Seismic implosive acoustic transmitter

U.S. Cl. X.R. 181-0.5R; 340-14



3,670,840

FLEXIBLE SEISMIC GAS EXPLODER

William J. Gundlach, Fulshear, Tex., assignor to Geo Space Corporation

Filed Aug. 6, 1969, Ser. No. 847,828

Int. Cl. G01v 1/00

U.S. Cl. 181-0.5 NC

12 Claims

This invention relates to a repetitive seismic energy source and includes a rigid combustion chamber coupled to a flexible gas supply system for supplying to the chamber a pressurized combustible gas mixture. A piston normally maintains the chamber gas tight. Simultaneously with the ignition of the gas mixture, the piston becomes accelerated away from an outlet of the chamber to abruptly release high-temperature, high-pressure gases into the surrounding water, the underlying earth crust of which is being seismically explored. The displacement of the piston is caused by the combustion of the gas mixture in the combustion chamber.

Keywords: Seismic explosive acoustic transmitter

U.S. Cl. X.R. 181-0.5R



3,670,896

APPARATUS FOR REMOVING OIL FROM A BODY OF WATER

Frank E. Hale, Jr., 1638 Santa Barbara Street, and Frank E. Hale, Sr., 4005 Santa Cruz Avenue, both of San Diego, Calif.

Filed Jan. 22, 1971, Ser. No. 108,839

Int. Cl. E02b 15/04

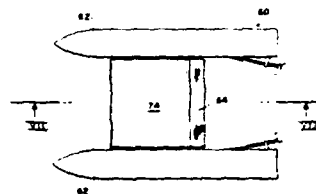
U.S. Cl. 210-242

2 Claims

Apparatus and method for removing a liquid hydrocarbon material, such as oil, from a water surface wherein the apparatus includes a collection surface which is moved into and out of the water, the collection surface being made of a material including a high molecular weight solid hydrocarbon which is wettable with oil so that when the surface emerges from the water the oil collected by adsorption is wiped from the surface and collected.

Keywords: Pollutant, mechanical removal; Pollutant removal watercraft

U.S. Cl. X.R. 210-391; 210-DIG.21



JUNE 27, 1972

3,672,175
ICE CUTTER

Charley Mack Mason, Denton, Tex., assignor to Sun Oil Company, Dallas, Tex.

Filed Oct. 2, 1970, Ser. No. 77,507
Int. Cl. E02b 15/02; B63b 35/12

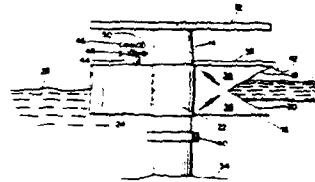
U.S. Cl. 61-46

10 Claims

A cutter rotatably mounted on a marine structure for cutting and diverting encroaching ice floes. The cutter has upper and lower cutting edges that are angled from one another and intersect. Sides angle away from the cutting edges, and the trailing edge of the sides flare outwardly to divert the ice around the marine structure. The cutter is attached to a sleeve which rotates around the marine structure in response to a vane member which also acts as a counterweight and is shaped to act as a protected boat dock.

Keywords: Ice protection; Offshore mooring structure; Offshore structure fender

U.S. Cl. X.R. 61-1; 114-41



3,672,177
SUBSEA FOUNDATION UNIT AND METHOD OF
INSTALLATION

William F. Manning, Dallas, Tex., assignor to Mobil Oil Corporation

Filed June 24, 1970, Ser. No. 49,372
Int. Cl. E02b 17/00, 17/08

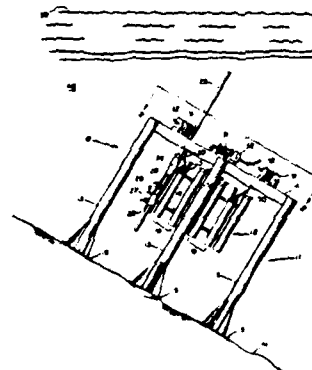
U.S. Cl. 61-46.5

14 Claims

The specification discloses a subsea foundation unit for use in drilling and completing a plurality of submerged wells particularly in areas where the marine bottom slopes or is uneven. The unit is comprised of a base and a drilling and completion template. The unit is lowered in the water until the base engages the marine bottom. The template is adjusted with relation to the base until the template is substantially level. Next, the template is secured to the bottom and is released from the base. The base is removed leaving only the leveled template on the bottom.

Keywords: Offshore construction; Pile placement; Seabed foundation; Seabed oil, process structure

U.S. Cl. X.R. 175-7; 175-9



AD-A080 796

COASTAL ENGINEERING RESEARCH CENTER FORT BELVOIR VA F/8 13/2
AN ANNOTATED BIBLIOGRAPHY OF PATENTS RELATED TO COASTAL ENGINE--ETC(U)
NOV 79 R E RAY, M D DICKEY, A M LYLES
CERC-89-79-6-VOL-2-APP ML

F/C 13/2

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409079#

3,672,178

ROTARY DOCK

Paul A. Trautwein, 1906 Holiday Road, Newport Beach, Calif.
Filed Nov. 23, 1970, Ser. No. 91,921
Int. Cl. E02d 29/06

U.S. Cl. 61—46

7 Claims

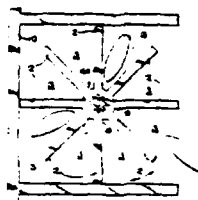
Keywords: Pier, floating; Small-craft pier

U.S. Cl. X.R. 114-0.5

This disclosure relates to the berthing of boats, and to the problem caused by the need for providing maneuvering room to permit the boats to enter their boat slips. This problem is particularly acute for larger boats and for the less experienced skippers.

The disclosed invention teaches the use of a rotary dock, somewhat similar to a merry-go-round, having a plurality of boat slips associated therewith. In use, the rotary dock is rotated so that any given one of the plurality of boat slips may be positioned at any desired peripheral location.

Thus, in the case of a mooring arrangement in a marina, any boat slip of the rotary dock may therefore be positioned at a peripheral location that facilitates the boat's entering or leaving the channel, whereas, in the case of a marine service station that is already crowded with boats being serviced, the rotary dock may be rotated so that an empty boat slip in a location to receive the newly arrived boat. In the case of a boat rental or a boat sales agency having a large inventory of boats, the rotary dock may be rotated so that any desired boat of the inventory may be made available for customer examination or use.



3,673,407

**RADIOGRAPHIC APPARATUS FOR UNDERWATER
INSPECTION OF WOODEN PILING**

George C. Wirwell, Jr., 1014 Pequot Road, Southport, Conn.
Filed Feb. 19, 1969, Ser. No. 800,432
Int. Cl. H01J 37/20

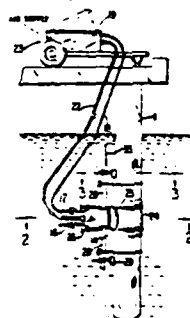
U.S. Cl. 250—52

3 Claims

Keywords: Instrument, radioisotope; Pile, wood; Structure inspection

U.S. Cl. X.R. 250-53; 250-65

An underwater apparatus employing radioactive material comprising a cylindrical chamber having a flexible end wall with the chamber being mounted against an underwater object through which the radiant energy rays are to be passed for radiographic purposes so that the flexible wall conforms to the surface of the object. A film pack is retained on the other side of the object opposite the flexible wall, and water is evacuated from the chamber. A source of radiation is positioned through a flexible conduit into the closed chamber opposite the flexible wall. The chamber has an inlet valve connected to a source of air under pressure and an exhaust valve.



3,673,554

DEPTH SOUNDER DIGITIZER

Silvan E. McAlpin, Dallas, Tex., assignor to Mobil Oil Corporation

Filed Sept. 30, 1969, Ser. No. 863,204
Int. Cl. G01s 9/68

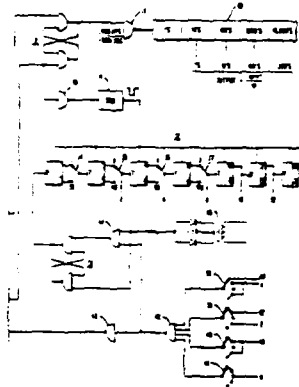
U.S. Cl. 340-3 R

4 Claims

a water depth digitizer produces an averaged digital readout synchronized with an external clock. The digital readout is produced from a depth sounder having a timing cycle which is asynchronous with respect to the clock. A digital counter is started in response to the occurrence of selected acoustic ranging pulses. Pulses which are proportional in time to the velocity of sound in water are counted until the returned echo from the sea bottom stops the count. Ten counts are accumulated in the digital counter which is arranged to count in decades. The least significant decade is dropped to produce a readout directly representing water depth.

Keywords: Sonar, depth sounder

U.S. Cl. X.R. 340-1C



3,673,556

TWO-LEVEL DEPTH CONTROLLERS FOR SEISMIC STREAMER CABLES

Paul G. Biggs, Houston, Tex., assignor to Western Geophysical Company of America, Houston, Tex.

Filed July 15, 1970, Ser. No. 55,038

Int. Cl. B63b 21/56; G01v 1/16; H01b 7/12

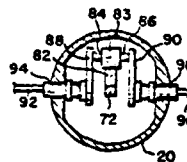
U.S. Cl. 340-7 PG

11 Claims

This invention relates to controllers for seismic streamer cables for controlling the depth of the streamer cable while it is towed through a body of water. The controller is adapted to maintain the streamer cable at one predetermined level, and upon receipt of a remote-control signal the controller moves the cable to another predetermined level.

Keywords: Seismic streamer cable; Towed body depth control

U.S. Cl. X.R. 114-235B; 340-7R



JULY 4, 1972

3,673,716
COMPRESSED AIR OPERATED APPARATUS FOR
RAISING UNDERWATER DEPOSITS

Alois Trondle, Wasserburger Landstrasse 209, 8000 Munich
82, Germany

Filed Sept. 22, 1969, Ser. No. 859,872

Claims priority, application Germany, Dec. 20, 1968, P 18
16 221.5

Int. Cl. E02f 3/92

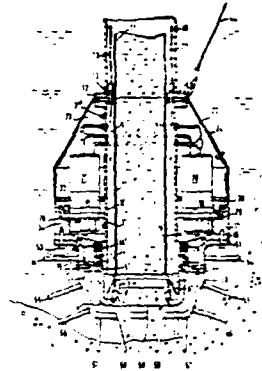
U.S. Cl. 37-61

17 Claims

Apparatus for raising deposits, using a pressure medium, the material being raised being conveyed via a dredge pipe from the deposit to a separator in which the material raised is separated from the pressure medium and possibly from entrained portions of a liquid medium disposed above the deposit, the pressure medium being introduced at the lower end of the dredge pipe into the latter with a rotational component and in such a manner that a partial vacuum is produced under the effect of which the material to be raised enters the dredge pipe, the inlet end of the dredge pipe being held during dredging at a small distance from the deposit.

Keywords: Dredge, cutterhead; Dredge intake; Pump

U.S. Cl. X.R. 37-67; 302-58



3,673,804
OFF-SHORE FIRE AND POLLUTION CONTROL SYSTEM
Frank R. Washburn, 11 North York Street, Houston, Tex.
Filed Feb. 13, 1970, Ser. No. 870,295

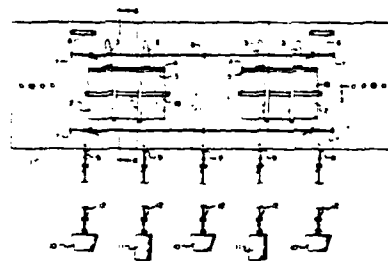
Int. Cl. E02b 15/04

U.S. Cl. 61-1 F

1 Claim

A portable, flexible, floating firewall having a rectangular galvanized metal body and four essentially identical flotation packets, two disposed on each side of the metal body. The flotation packets are formed of Styrofoam and encased in a plastic container which is covered with a layer of asbestos cloth on all exposed portions of the container. A plurality of steel bands secure the flotation packet to the body and an outwardly projecting rigid shelf is mounted immediately above the flotation packet to hold the flotation packet in place. Two horizontally directed cables are anchored near each end of the body on both sides thereof. The cables are adjustable in length in order to control the degree of bending which will be allowed the body. Ballast weights removably connected by cables to the bottom edges of the body continuously urge the body in the upright position in the water.

Keywords: Pollutant, surface barrier



3,673,805

FLOATABLE BREAKWATER ELEMENT

Bruno Szyfter, Kathe-Dorsch-Ring 12, 1 Berlin, 47, Germany
Filed Nov. 12, 1969, Ser. No. 876,097

Claims priority, application Germany, Nov. 12, 1968,
P 18 09 506.2

Int. Cl. E02b 3/06; B63b 7/00

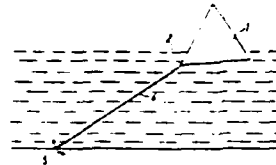
U.S. Cl. 61-5

8 Claims

An inflatable elongate prismatic sheet-material shell of triangular profile has a reinforced edge attached to an anchor chain which, together with the shell and the anchor, can be folded into a package in which the sheet material of the shell is wrapped around the anchor and chain. The package, and/or each of its components, is held in a collapsed position by water-soluble bands whereby the anchor slips out of its sheet wrapping when the package is immersed, the shell being then automatically inflated by one or more compressed-air cartridges.

Keywords: Breakwater, floating

U.S. Cl. X.R. 9-2; 9-11.1



3,673,808

METHOD OF AND APPARATUS FOR BURYING SUB-SEA PIPELINES, CABLES AND THE LIKE

Johan H. Volbeda, Rijswijk, Netherlands, assignor to Nederlandse Maatschappij voor werken Buitengaats (Netherlands Offshore Company) N.V., The Hague, Netherlands
Filed April 6, 1970, Ser. No. 25,747

Claims priority, application Great Britain, April 10, 1969,
18,538/69

Int. Cl. F16I 11/00; E02I 5/02

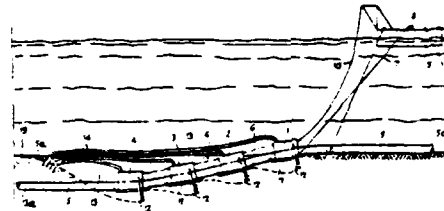
U.S. Cl. 61-72.4

10 Claims

Pipelines, including cables, are buried in the seabed, which includes the bed of other water covered areas, by a succession of trenching devices travelling along the pipeline one behind the other, the trenching devices each loosening the soil beneath the pipeline and conveying the loosened material from beneath the pipeline to successively increase the depth of a trench beneath it in a continuous and gradual manner whereby the pipeline is laid in the trench at a predetermined depth in a single pass of the trenching devices. The removed soil is used to backfill the trench after the pipe has been laid.

Keywords: Seabed pipeline placement;
Seabed trencher

U.S. Cl. X.R. 37-63



3,673,976

SECTIONALIZED PONTOON APPARATUS

Richard W. Reynolds, 110 Mayo Drive, Burnsville, Minn.
Filed Nov. 21, 1969, Ser. No. 878,627

Int. Cl. B63b 35/38

U.S. Cl. 114-61

16 Claims

A pontoon boat, raft, dock or the like made from a plurality of pontoon sections having longitudinally extending tabs and transversely extending tabs, stringers bolted to longitudinally aligned longitudinal tabs, cross pieces bolted to the transverse tabs and a deck. Other than for the nose cone section for a boat, the pontoon sections have slotted end portions to receive a block to minimize twisting of adjacent pairs of pontoon sections. Further, the nose cone sections are interchangeable and each of the other pontoon sections are of the same construction.

Keywords: Pier, floating; Small-craft pier

U.S. Cl. X.R. 9-1R; 9-11R



195

3,674,150
APPARATUS FOR PREVENTING OFFSHORE OIL WELL POLLUTION

Lloyd M. Lejeune, P.O. Box 243, Belle Chasse, La.
 Filed Sept. 25, 1970, Ser. No. 75,322
 Int. Cl. B01d 23/00

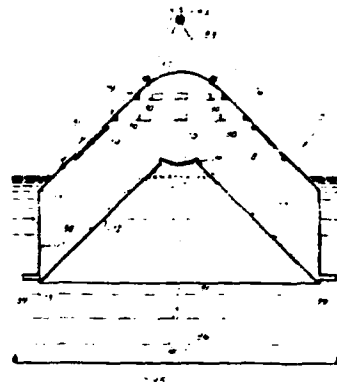
U.S. Cl. 210-245

9 Claims

An apparatus for preventing offshore oil well pollution resulting from offshore oil well blowouts or pipe line ruptures. The apparatus includes a sloping cylindrical member having a conical bottom wall open at its upper end. The device is centered over the leak so that the oil passes up into the device through the open top of the conical bottom wall. In the case of a low pressure leak the oil flows down the upper face of the conical wall and is collected in a sump within the apparatus from which it can be pumped. In the case of high pressure blowouts valve plates are provided which can be hydraulically closed to contain the oil spout which then flows into a sump in the apparatus surrounding the conical bottom wall. This sump also may be emptied by pumping. In both instances fire extinguishing gases may be pumped into the device in case ignition of the gas and oil should occur.

Keywords: Pollutant collection; Pollutant, submerged barrier

U.S. Cl. X.R. 210-DIG.21



3,674,683
PROCESS FOR THE REMOVAL OF OIL FROM THE SURFACE OF A BODY OF WATER

Norman B. Rainer, Richmond, Va., assignor to Philip Morris Incorporated, New York, N.Y.
 Filed Jan. 2, 1970, Ser. No. 420
 Int. Cl. E02b 15/04

U.S. Cl. 210-40

2 Claims

This disclosure relates to a process for removal of oil from the surface of a body of water, wherein a material comprising a particulate microporous hydrophobic vinyl chloride polymer, such as polyvinyl chloride, is applied to the oil.

Keywords: Pollutant absorption

U.S. Cl. X.R. 210-DIG.21

No Figure

3,675,193
HOOP STRESSED BEAM HYDROPHONE

Billy W. Davis, Flagstaff, Ariz., assignor to Schlumberger Technology Corporation, New York, N.Y.
 Filed Dec. 28, 1970, Ser. No. 101,873
 Int. Cl. G01v 1/16

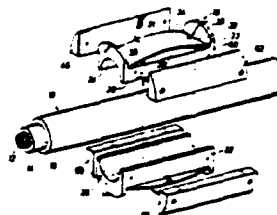
U.S. Cl. 340-10

21 Claims

Seismic hydrophone streamer assemblies are constructed utilizing hydrophones which comprise cylindrical segments of crystals disposed with the axis of the crystals transverse to the axis of the streamer cable. This construction permits usage of a crystal having a diameter significantly larger than the diameter of the cable regardless of whether the crystal is disposed internally of a streamer cable. A crystal mounting means is provided which can be affixed to the exterior of a central stress member streamer cable and which supports the crystal solely by the edge of the crystal segment parallel to the cylindrical axis of the cylinder.

Keywords: Seismic hydrophone; Seismic streamer cable

U.S. Cl. X.R. 310-9.1; 340-88



196

JULY 11, 1972

3,675,429

ARCTIC ICE PLATFORM

Bertram T. Willman, Marsa Brega, Libya, assignor to Esso
Production Research Company

Filed April 3, 1970, Ser. No. 25,464

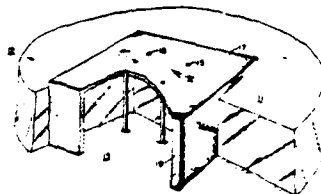
Int. Cl. E02d 27/04

U.S. Cl. 61-46

6 Claims

A method of forming a permanent offshore platform in areas where a mass of ice rests on the earth's surface in winter but thaws during more moderate weather. The platform is formed by insulating the surface of the ice proximate the drilling site to prevent any substantial thawing of the ice.

Keywords: Ice structure; Ice protection;
Offshore construction; Offshore
island; Offshore platform, fixed



3,675,431

OFF-SHORE STORAGE TANKS

Robert G. Jackson, Hornchurch, England, assignor to Conch
International Methane Limited, Nassau, Bahamas

Filed May 17, 1971, Ser. No. 143,872

Claims priority, application Great Britain, May 26, 1970,
26,035/70

Int. Cl. E02d 29/06; B65g 5/00; F25d 23/00

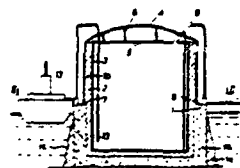
U.S. Cl. 61-46

4 Claims

An off-shore storage tank for liquefied gas has an outer shell, of which at least the lower part, which is immersed in the water, is made of solid concrete, sufficiently thick and heavy when in place to sink in the water even when empty, and is lined with thermal insulation such that in operation, when storing liquefied gas at cryogenic temperatures, the said lower part is maintained at a surface temperature below the freezing point of the water in which it is immersed so that a coating of frozen water is formed on the tank which acts as an additional seal for the concrete. Other features are that the upper part of the tank wall is sufficiently thinner than the lower part to provide an external annular step constituting a walkway around the tank, and the provision of tangential piers as part of the tank structure at points opposite to and adjacent the shore line. The tank is preferably made initially light enough in weight so that it can be floated to its location of use, then further concrete or other loading is added to sink the tank to the sea bed.

Keywords: Offshore storage tank, emergent

U.S. Cl. X.R. 61-.5; 61-36A; 61-46.5;
62-45; 220-9LC; 220-13; 220-18



3,675,610
**MOORING STRUCTURE IN COMBINATION WITH A
 FENDER**

Walter Kohring, Angle View, Pilgrim's Way, West Humble,
 Dorking, Surrey, England
 Filed March 18, 1971, Ser. No. 125,645
 Claims priority, application Great Britain, March 19, 1970,
 13,263/70

Int. Cl. B63b 21/00

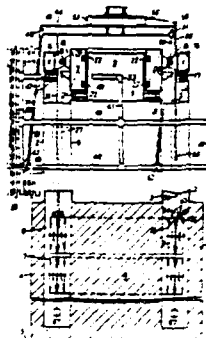
U.S. Cl. 114-230

10 Claims

A mooring structure in combination with a fender, the mooring structure comprising a fixed element supporting a rotatable head having first and second relatively rotatable parts, a weight structure supported by a plurality of pairs of ropes, the ropes of each pair being respectively connected to the first and second parts so that relative rotation of the parts lifts the weight structure by increasing the angle between the ropes of each pair to provide an increasing restoring force, movement of the fender causing such relative rotation of the parts and adjustment means for adjusting the effective lengths of the ropes to adjust the device to form a 'soft' fender or a 'hard' fender.

Keywords: Offshore mooring structure; Offshore platform, fixed; Offshore fender

U.S. Cl. X.R. 114-219



3,676,840
**UNDERWATER SEISMIC ACOUSTIC ENERGY SIGNAL
 SOURCE**

Marvin G. Bays, Jackson, Miss., assignor to Delta Exploration
 Company, Inc., Jackson, Miss.
 Filed Sept. 9, 1970, Ser. No. 70,794
 Int. Cl. H04b 11/00

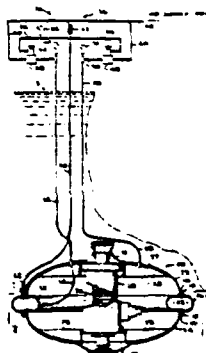
U.S. Cl. 340-12

13 Claims

An acoustic signal means is provided with two signal radiating hollow shell members which are connected by a hydraulic cylinder for outward relative movement with an inflatable toroidal connector member connecting circular edges of the shell members to define a main interior chamber with the shell members and pressure regulating means for maintaining pressure on the interior of the toroidal member at a level slightly higher than the maximum pressure differential between the main interior chamber and the external environment and also having pressure regulating means for maintaining an average pressure in the internal chamber substantially equal to the external pressure.

Keywords: Seismic vibratory acoustic transmitter

U.S. Cl. X.R. 310-8.9



JULY 18, 1972

3,677,016
CORROSION PROTECTION FOR WELL CASING OF
OFFSHORE STRUCTURE

James P. Garrigus, Downers Grove, Ill., assignor to Chicago
Bridge & Iron Company, Oak Brook, Ill.

Filed Feb. 8, 1971, Ser. No. 113,190
Int. Cl. E02d 21/00; E21b 15/02

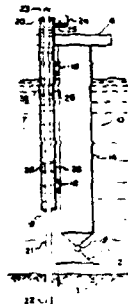
U.S. Cl. 61-46.5

7 Claims

Keywords: Corrosion prevention; Offshore
platform, floating

U.S. Cl. X.R. 175-9

An offshore deep water oscillating oil well drilling or oil production structure having an oil drilling or oil production platform and support therefor having an essentially vertically displaced tubular template fixedly secured to the platform and platform support, said tubular template having its bottom end open and positioned to project below sea level when the platform is positioned offshore in a body of water, a closure at the upper end of the tubular template adapted to seal and close the annular space between the tubular template and a casing positioned in the tubular template, and a conduit communicating with the inside of the tubular template below the closure for feeding oil inside the tubular template.



3,677,017
DOCK FENDER STRUCTURE

John Anoush Shirvany, Simi, Calif., assignor to Byron Jackson,
Inc., Long Beach, Calif.

Filed Oct. 20, 1970, Ser. No. 82,281
Int. Cl. E02b 3/22

U.S. Cl. 61-48

10 Claims

Keywords: Pier fender

U.S. Cl. X.R. 267-140

A marine dock fender element having an elastomeric deflection body in connection with support plates at each end of the deflection body with deflection guide members associated with each support plate and the deflection body.



3,677,018

**METHOD FOR DRIVING A FOUNDATION ELEMENT
INTO THE EARTH BY MEANS OF VIBRATION**

Abraham Francois Van Weele, Waddinxveen, Netherlands, assignor to N.V. tot Aanneming van Werken voorheen H.J. Nederhorst, Gouda, Netherlands

Filed April 15, 1970, Ser. No. 28,709

Claims priority, application Netherlands, April 22, 1969, 6906153

Int. Cl. E02d 7/18, 3/12

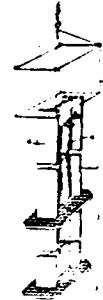
U.S. Cl. 61-53.5

3 Claims

A method for driving a foundation element into the earth by means of vibration. According to the invention at least one perforated supporting member is taken along by the foundation element when this element is vibrated into the earth. This perforated supporting member may be a perforated plate or a grid composed of upstanding partitions.

Keywords: Grouting; Pile driver, vibratory;
Pile-driving shoe; Pile footing;
Pile, steel

U.S. Cl. X.R. 52-740; 61-53; 61-53.6



3,677,113

**METHOD AND APPARATUS FOR FORMING A
FOUNDATION-LEG ASSEMBLY FOR AN OFFSHORE
PLATFORM**

William R. Bowles, Bartlesville, Okla., assignor to Phillips Petroleum Company

Filed Jan. 7, 1971, Ser. No. 104,606

Int. Cl. E02d 5/40, 5/44, 27/32

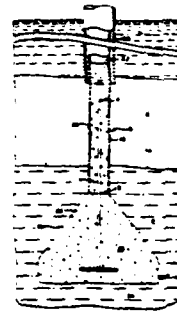
U.S. Cl. 61-46

13 Claims

A pile is driven through a first formation and into a subterranean second formation of the earth beneath a body of water, a cavity is formed below the pile and extends outwardly beyond the pile, and a concrete volume is thereafter formed in the cavity and a portion of the pile. The pile is in intimate contact with the first and second formations and the concrete is in intimate sealing contact with the pile and the second formation.

Keywords: Offshore construction; Offshore platform, leg; Pile, concrete; Pile footing; Pile, steel; Seabed foundation

U.S. Cl. X.R. 61-52; 61-53.6; 61-53.64



JULY 25, 1972

3,679,004

DRAG SCRAPER FOR DREDGING SILT

Henry Albert Loy, 87 N. 11th West, Provo, Utah

Filed July 15, 1970, Ser. No. 54,910

Int. Cl. E02F 3/60

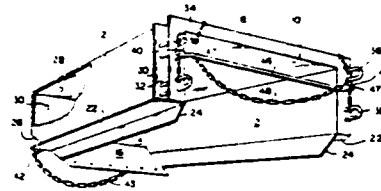
U.S. Cl. 172-26.5

10 Claims

The invention includes a scraper and its combination with a catamaran. The scraper has a top wall, side and rear walls, an open front and bottom, a blade adjacent to the rear wall and an outwardly extending support shoe secured to each side wall adjacent and parallel to but spaced from its bottom edge. The top and side walls are reinforced by flanges at the front end where hooks are secured for a chain to pull the scraper forwardly. Water escape openings are provided in top and side walls. The catamaran comprises two spaced floats and lifting mechanism so that the scraper used in combination therewith can be lifted into the space between the floats and lowered into contact with the silt at the bottom of a body of water.

Keywords: Dredge, mechanical

U.S. Cl. X.R. 37-71; 37-115



3,679,005

DIESEL HAMMER

Kohsuke Inabe; Selsaku Yoshida, both of Tokyo; Shoji Matsura, and Tsukasa Murakami, both of Yokohama, all of Japan, assignors to Ishikawajima-Harima Jukogyo Kabushiki Kaisha, Tokyo-to, Japan

Filed Oct. 19, 1970, Ser. No. 82,041

Claims priority, application Japan, Oct. 24, 1969, 85078; Oct. 24, 1969, 44/85079; Oct. 24, 1969, 44/85080

Int. Cl. E02A 7/12

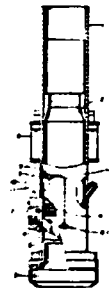
U.S. Cl. 173-128

5 Claims

The present invention provides a diesel hammer having as major structural parts a cylinder whose upper end is opened, a ram slidably fitted into said cylinder, an anvil fitted into the lower end of said cylinder, and a fuel tank, a fuel pump and nozzles mounted upon the outer surface of said cylinder. A port is formed through said cylinder so as to deliver the air under pressure from the cylinder to said fuel pump and to deliver the fuel in said fuel tank to said nozzles.

Keywords: Pile driver, impact

U.S. Cl. X.R. 173-137



3,679,021

ACOUSTIC PULSE GENERATING SYSTEM

Seymour Goldberg, Lexington, Mass., assignor to EG&G, Inc., Bedford, Mass.

Continuation-in-part of Ser. No. 313,625, April 4, 1969, Pat. No. 3,610,366. This application March 25, 1970, Ser. No. 22,425

Int. Cl. G01v 1/14

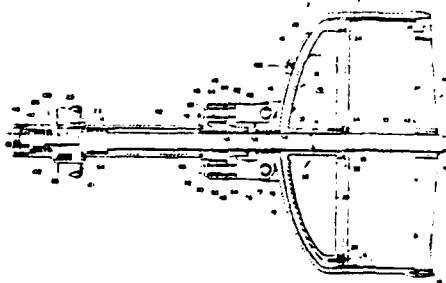
U.S. Cl. 181-5 H

20 Claims

An acoustic pulse generator and a method of producing acoustic pulses in a fluid medium is provided. In a preferred embodiment of the invention, the acoustic pulse generator includes a piston slidably disposed within a cylindrical housing having one end open and one end closed to the fluid medium. When the generator is submerged, the piston is accelerated toward the closed end of the cylindrical housing by the ambient pressure of the fluid medium and rebounds from the closed end of the cylindrical housing to produce an acoustic pulse. Means are provided for capturing the piston after its rebound from the closed end of the cylindrical housing to prevent subsequent inward movement of the piston by the ambient pressure.

Keywords: Seismic implosive acoustic transmitter

U.S. Cl. X.R. 181-5AG; 340-3A; 340-12R



3,679,058

OIL COLLECTION BOOM

Millard F. Smith, P.O. Box 295, Saugatuck, Conn.

Continuation-in-part of Ser. No. 739,231, June 24, 1968, Pat. No. 3,539,013. This application Jan. 27, 1970, Ser. No. 6,117. The portion of the term of this patent subsequent to Nov. 10, 1987, has been disclaimed.

Int. Cl. C02b 9/02

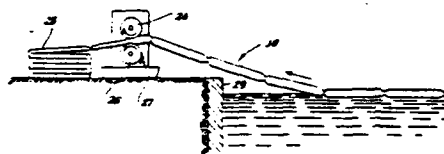
U.S. Cl. 210-242

6 Claims

An oil absorbing boom to be deployed across the effluent stream from a separator or settling basin on the downstream side of oil transfer operations at a seaport for the purposes of collecting and removing from the water thin films of oil such as those which sometimes escape from oil spill booms surrounding a tanker at a loading dock, and comprising an elongated flat tubular sleeve of polymer netting enclosing within itself a plurality of flat elongated slabs or bats of "picker-lap" fibrous polymer material such as blown polypropylene film arrayed end to end within the tubular sleeve and sufficiently spaced apart to permit accordion folding of the sleeve at fold lines between adjacent bats, with a tension-bearing rope or cable being positioned within the tubular sleeve alongside the successive plurality of absorbent bats to reinforce the structure for carrying its own weight or impact loads placing it in tension between its ends. Alternatively, a continuous, wide, flat sheet of extremely porous hydrophobic foam material such as fully reticulated polyurethane foam, suspended from overlying buoyant flotation material, is formed into a similar elongated boom deployed across a floating oil film or into a continuous endless belt repeatedly cycled through the floating oil. After trapping oil within the porosities or interstices of the boom or belt material, it is squeezed between pinch rolls to force out and recover the trapped oil, and the device is thus capable of successive repeated deployment cycles of oil recovery operation.

Keywords: Pollutant absorption; Pollutant collection; Pollutant, mechanical removal; Pollutant, surface barrier

U.S. Cl. X.R. 210-DIG.21



3,679,466
REPELLING OF MARINE ANIMAL PESTS
 Mark M. Bowman, Jr., Bartlesville, Okla., assignor to
 Phillips Petroleum Company
 No Drawing. Filed Mar. 6, 1970, Ser. No. 17,305
 Int. Cl. A01n 9/12; B44d 1/26, 1/34
 U.S. Cl. 117-127 10 Claims

Methods of repelling marine animal pests from structures comprising wood and/or metal using an N,N-dimethylsulfenyl dithiocarbamate.

Keywords: Fouling prevention; Wood preservative

U.S. Cl. X.R. 106-15AF; 117-147; 424-29; 424-300

No Figure

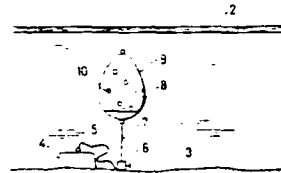
AUGUST 1, 1972

3,680,160
FLOAT FOR SEAMARKS, BUOYS, PONTOONS AND THE LIKE
 Toumo Jorma Heikki Sihvo, Keiholehdentie 6,
 Tikkurila, Finland
 Filed Nov. 18, 1970, Ser. No. 90,669
 Claims priority, application Finland, Nov. 20, 1969, 3362
 Int. Cl. B63b 21/52, 51/02
 U.S. Cl. 9-8 R 3 Claims

A medium having a dew point close to the freezing point of the surrounding water is enclosed in a watertight collapsible hollow body anchored to the bottom.

The collapsible body, which normally floats at the surface of the surrounding water, sinks when the freezing point of the water is approached due to the condensation of the medium. The hollow body remains submerged in a collapsed state until the water warms, vaporizing the medium and causing the body to float again.

Keywords: Buoy mooring system; Ice protection; Pier, floating; Small-craft mooring device



3,680,216
METHOD OF MEASURING THE RELATIVE DEPTH BETWEEN TWO OR MORE UNDERWATER LOCATIONS
 Lawrence W. Hallanger, Oxnard, Calif., assignor to The United States of America as represented by the Secretary of the Navy
 Filed Feb. 24, 1971, Ser. No. 118,247
 Int. Cl. G01c 5/04
 U.S. Cl. 33-301 3 Claims

A method of measuring the relative underwater depth between two or more underwater locations utilizing a gas filled hose connected at each end to a transparent vertically extending measuring tube with the lower end of both tubes open to provide a gas-water interface. Thus when the tube at one end of the hose is moved up or down, depending on the depth of the underwater terrain, the gas-water interface shifts relative to that measuring tube to maintain a level with the gas water interface(s) and the other tube(s).

Keywords: Seabed site survey

U.S. Cl. X.R. 33-367



3,680,232

BUCKET LADDER DREDGER

Cornelis van der Gaag, Delft, Netherlands, assignor to N.V. Industriële Handelscombinatie Holland, Rotterdam, Netherlands

Filed May 13, 1970, Ser. No. 36,983

Claims priority, application Netherlands, May 13, 1969, 07346/69

Int. Cl. E02F 5/06, 5/28

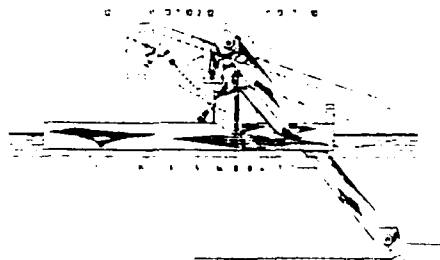
U.S. Cl. 37-69

5 Claims

A bucket dredger comprises a pontoon and a bucket ladder mounted on the pontoon for bodily vertical swinging movement relative to the pontoon. The ladder mount comprises vertically swinging arms pivotally interconnected to the pontoon and to the ladder and jacks for swinging the arms. The ladder carries rollers that roll on an upwardly inclined track on the pontoon, the summit of the track being intermediate its ends so that in an upwardly swung position the ladder will be horizontal. The support arms extend beyond the point of pivotal connection to the ladder and at their free ends are connected by links to a chute which is thus maintained vertical in all positions of the ladder.

Keywords: Dredge ladder control; Dredge, mechanical

U.S. Cl. X.R. 37-86; 37-191R



3,680,275

UNDERWATER STORAGE TANKS

Jean Romjet, La Celle Saint-Cloud, and Armand Cimadevilla, Neuilly Chauts de Seine, both of France, assignors to Societe Anonyme Des Entreprises Leon Ballot, Paris, France

Filed Dec. 29, 1969, Ser. No. 888,656

Claims priority, application France, Dec. 30, 1968, 181997

Int. Cl. E04c 1/40; E04h 7/20

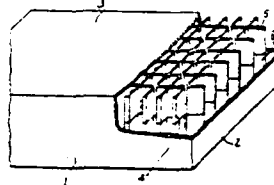
U.S. Cl. 52-227

1 Claim

This invention relates to a reservoir suitable for immersion in the sea or like surrounding medium and is mainly intended for the storage of hydrocarbons. The reservoir is formed from elements prefabricated in two-dimensionally prestressed concrete which are held together by a structure of three-dimensionally prestressed concrete. The reservoir is preferably of cellular structure and is adapted to rest freely on the sea floor.

Keywords: Offshore storage tank, submerged

U.S. Cl. X.R. 52-236; 220-1B



3,680,320
OFF-SHORE TRANSPORTATION, INDUSTRIAL AND
URBAN COMPLEX

George O. Goodboy, Jr., Altadena; Donald W. Green, Woodland Hills, and Conrad J. Kopec, Los Angeles, all of Calif., assignors to Macro Synthetic Systems, Inc., Canoga Park, Calif.

Filed Dec. 11, 1970, Ser. No. 97,060
Int. Cl. E02b 1/00; B61b 1/00; B61f 1/00

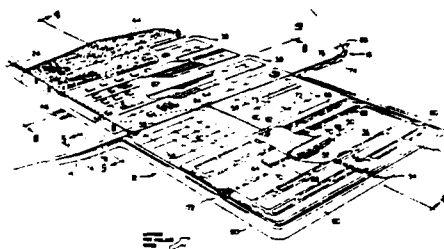
U.S. Cl. 61-46

13 Claims

A man-made island is located just off the coast to provide international airport and shipping facilities. The airport is located on the outer extreme of the island with runways paralleling the coast and extending in the direction of the prevailing winds. The sound contours drop off from the airport zone at the outer end of the island to a relatively low level at the inner end of the island close to the coast. The maximum height contour permitted by regulations increases in a direction perpendicular to the runways gradually so as to permit high-rise buildings at the end of the island closest to the coast. Industrial facilities which can tolerate a higher noise level and have lesser height requirements are located in the central portion of the island between the airport and the high-rise buildings. The airport area is raised significantly with respect to the main portion of the island. This provides additional safety against ocean surges toward the outer exposed end of the island and also permits easy access from the surface highways on the main portion of the island into underground tunnels and parking facilities in the airport area. Causeways extend from the mainland to the island at several points. In addition to providing highway and rapid transit access, the causeways may shield harbor and other facilities on the inner portion of the island from rough seas. The retaining caissons terminate below water level, and beaches are provided at the interface between the island and the water, and between the causeways and the water. These beaches provide recreation areas and a measure of safety for emergency landings and the like.

Keywords: Breakwater, rubble; Offshore harbor, Offshore island

U.S. Cl. X.R. 61-1; 61-3; 61-35; 61-49; 104-27; 244-114



3,680,321
MOBILE OFFSHORE PLATFORM

Cornelis Bordes, Vlaardingen, Netherlands, assignor to N.V. Industriële Handelscombinatie Holland, Rotterdam, Netherlands

Filed Dec. 3, 1970, Ser. No. 94,732
Claims priority, application Netherlands, Dec. 4, 1969, 18255/69

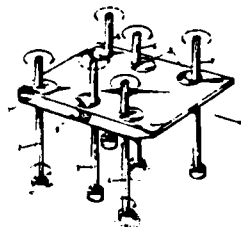
Int. Cl. E02b 17/00; E02f 9/04; B65b 21/50
U.S. Cl. 61-46.5

6 Claims

A mobile offshore platform has at least five columns mounted eccentrically in rotatable frames on the platform. Each column has a foot at its lower end in which the column is rotatably disposed. The platform can walk on the sea floor by lowering three feet, raising the remaining feet, rotating the frames of the lowered feet whereupon the platform advances with an arcuate movement while the column rotates in its emplaced foot, then lowering the raised feet, and so on.

Keywords: Offshore platform, jack up; Offshore platform, walking

U.S. Cl. X.R. 115-9



3,680,644

PILE DRIVING SYSTEM AND APPARATUS

Samuel Clifford Doughty, Burlingame, Calif., assignor to Santa Fe International Corporation, Santa Fe Springs, Calif.

Division of Ser. No. 756,085, Aug. 30, 1968, Pat. No.

3,604,522. This application Dec. 29, 1970, Ser. No. 101,458

Int. Cl. E02d 7/00

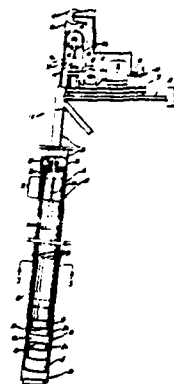
U.S. Cl. 173-139

5 Claims

A system for driving piles by a succession of blows struck from above by a hammer element wherein a driving head assembly transfers the blows to the upper end of a hollow elongated pile. The hollow pile entraps a water column beneath the head and means are formed in the head for transmitting portions of the water column via the head in response to blows struck upon the head. A cushion of entrapped gas is disposed between the head and column of liquid to momentarily absorb reactive forces derived from the column of water.

Keywords: Offshore construction; Pile driver, impact; Pile, steel

U.S. Cl. X.R. 61-53; 138-177



3,681,747

SEA BOTTOM SLOPE MEASURING APPARATUS

George M. Walsh, Middletown, R.I., assignor to Raytheon Company, Lexington, Mass.

Continuation of Ser. No. 776,722, Nov. 18, 1968, abandoned.

This application July 6, 1970, Ser. No. 56,129

Int. Cl. G01s 9/66, 3/00

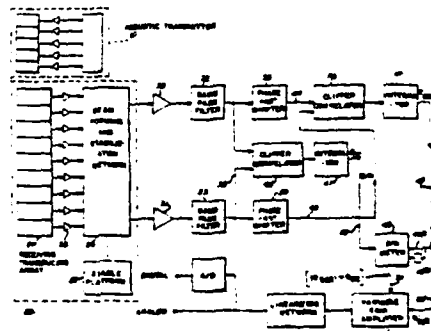
U.S. Cl. 340-3 R

13 Claims

Sea bottom slope is measured by projecting an acoustic beam upon the sea bottom with reference to a local vertical and measuring the arrival angle between incident echos and the local vertical. Split receiving beams having separated phase centers are utilized to measure the arrival angle. In order to reduce the effects of noise, phase angle magnitude and sign are determined by signal processing means which utilize a greater proportion of the available energy in large time bandwidth product signals.

Keywords: Sonar, depth sounder

U.S. Cl. X.R. 340-3F; 343-5CM; 343-16R



AUGUST 8, 1972

3,681,862

**SUCTION DREDGER HAVING PLURAL PUMPS AND
PLURAL ARTICULATED PIPE SECTIONS**

Jan De Koning, Amsterdam, and Tjako Aaldrik Wolters,
Utrecht, both of Netherlands, assignors to N.V. Ingenieur-
sbureau voor Systems en Octrooien "Spanstaal", Rotterdam,
Netherlands

Filed Nov. 17, 1969, Ser. No. 877,141

Claims priority, application Netherlands, Nov. 20, 1968,
6816590

Int. Cl. E02f 3/88

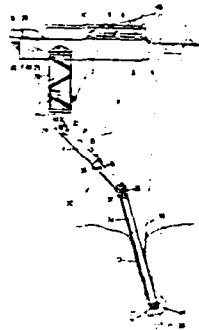
U.S. Cl. 37-58

4 Claims

Suction dredger for sucking up a particulate material such as sand. A suction pipe is inserted into a body of sand below the bottom of a body of water to withdraw water-sand suspension having a desired concentration of sand in such suspension. At the lower end of the pipe, the sand is drawn in at very high concentration and at some level above this point water is separately introduced so that a desired concentration is obtained. The suction pipe consists of at least two pipe parts swingably connected to each other. The maximum suction output of the submerged pump is obtained by swinging the frame supporting the pump into a vertical position.

Keywords: Dredge, suction; Dredge intake;
Dredge ladder control; Pump

U.S. Cl. X.R. 37-72



3,681,923

**METHOD AND APPARATUS FOR CONTROLLING
SUBNATANT OIL SEEPAGE**

Winfield H. Hyde, 618 Grand Ave., Berkeley, Calif.

Filed April 28, 1969, Ser. No. 819,805

Int. Cl. E02b 3/00; E02d 23/00

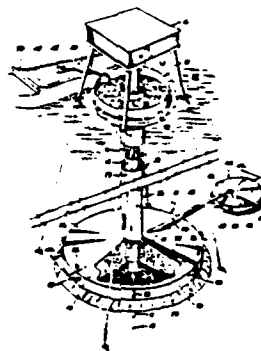
U.S. Cl. 61-1

3 Claims

Method of and apparatus for controlling subnatant seepage of oil as from an under water oil well or the like. The method includes the steps of collecting the seepage within an underwater receptacle located along the floor of a body of water in which the seepage occurs utilizing the floor as one of the confining walls of the receptacle. The seepage thus collected is conveyed upwardly in a confined state to the surface of the body of water and is deposited into a receiver from which the collected oil can be transported to a reservoir. The apparatus includes a receptacle open at its bottom to overlie the particular floor area of the body of water at which seepage is or may be present so as to collect or confine the seepage along the floor which serves as the bottom wall of the receptacle. A seepage conduit connected with the receptacle may be disposed circumjacent the outer conduit of an underwater well with which the apparatus is associated, and such conduit functions to carry the seepage from the receptacle to the surface of the water at which it empties into a receiver or reservoir from which the oil is pumped into a container for storage and processing as, for example, separation of the oil from water admixed therewith.

Keywords: Pollutant collection; Pollutant,
submerged barrier

U.S. Cl. X.R. 61-46; 210-170



3,683,324
**DEPTH METER HAVING IMPROVED TIME VARYING
 GAIN CONTROL**

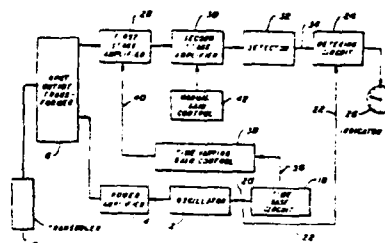
Frank E. Hoxsie, Tulsa, Okla., assignor to Lowrance Elec-
 tronics Manufacturing Corporation, Tulsa, Okla.
 Filed June 19, 1970, Ser. No. 47,728
 Int. Cl. G01s 9/6d

U.S. Cl. 340-3 R

4 Claims

This invention relates to a meter for indicating the depth of water. More particularly, the invention provides a depth meter having a transducer means for imparting sound pulses near the surface of a body of water in response to electrical energization and in turn for providing electrical signal output in response to reflected sound pulses, a time base circuit providing evenly spaced systems initiating signals, an oscillator circuit providing sequential bursts of electrical energy to the transducer, in response to the system initiating signals, a receiving amplifier connected to the transducer amplifying the reflected signal output in response to reflected sound waves, a metering circuit connected to the time base circuit and the amplifier providing means of indicating the time response between the transmitted signal and the signal received in response to receipt of sound waves as an indication of the distance to the bottom of the body of water reflecting the sound waves from the transducer and a time varying gain control circuit connected to the time base circuit and receiver amplifier providing a time varying bias to the amplifier following each system initiating signal, the bias being applied to the amplifier with time whereby signals resulting from the bottom at greater distances from the transducer are amplified more than signals resulting from shallower depths.

Keywords: Sonar, depth sounder



AUGUST 15, 1972

3,683,521
SUBMERSIBLE DREDGE

Albert H. Sloan, Fort Lauderdale, Fla.; Jack I. McLelland, Palos Verdes Peninsula; Theodore F. Mangels, Newport Beach, both of Calif., and Robert J. Jantzen, Baltimore, Md., assignors to Ocean Science & Engineering, Inc., Washington, D.C.

Filed March 5, 1970, Ser. No. 16,751
 Int. Cl. B63c 1/100; E02f 3/88

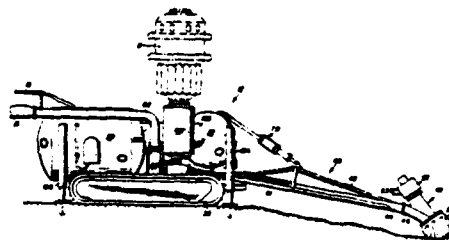
U.S. Cl. 37-56

11 Claims

A dredging system including a submersible, occupant-operated vehicle having an excavating tool carried thereby; a conduit extending from said tool to a location where said excavated material is to be deposited; a shore installation; and power and air conduits connecting said installations with the vehicle. The system is applicable to the excavation of large areas such as submerged deposits of sand and silt; the formation of narrow, deep trenches such as those utilized for various pipelines and cables; and the grading of level or specifically contoured areas for preparing the bottom for prefabricated structures.

Keywords: Dredge, cutterhead; Dredge ladder control; Dredge, submerged; Dredge-spoil transport

U.S. Cl. X.R. 37-67; 37-72



3,683,632

**METHOD OF LAYING A FOUNDATION FOR A
STRUCTURAL ELEMENT UNDER WATER**

Romke van der Veen, and Albert Griffioen, both of Utrecht,
Netherlands, assignors to Combinatie Westerschelde v.o.f.,
Utrecht, Netherlands

Filed July 28, 1970, Ser. No. 58,771

Int. Cl. E02d 27/52

U.S. Cl. 61—50

11 Claims

Under a structural element and around a supply place a crater is made by laying a dike of foundation material in the space under the structural element and around the supply place and the space around said crater is subsequently filled up with foundation material by supplying suspension of foundation material with water into the crater and by causing it to flow over the edge of said crater. With this method the edge of the crater grows gradually so as to form a continuous layer of foundation material. The suspension of foundation material with water flowing over the edge of the crater is heavier than silt found around the crater resulting in the suspension driving the silt before it out of the space without being mixed with the silt.

Keywords: Offshore construction; Seabed foundation; Seabed material placement



3,683,699

**METHOD OF RETRIEVING MARINE LIFE AND
MINERAL SPECIMENS FROM OCEAN'S DEEPEST
PARTS**

James C. Grady, Port Arthur, Tex., assignor to Gulf Oil Corporation, Pittsburgh, Pa.

Filed May 27, 1971, Ser. No. 147,477

Int. Cl. G01n 1/04

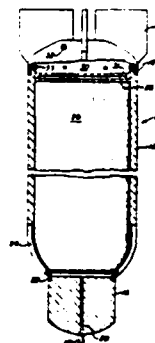
U.S. Cl. 73—421 R

12 Claims

A capsule for obtaining samples of sea bottom material contains a molten sample gathering material. A ballast member at the lower end of the capsule causes the capsule to sink freely when dropped into the sea. An explosive device, preferably located in the ballast member, is detonated when the capsule reaches the sea bottom and ruptures the capsule. A piston within the capsule above the sample gathering material is driven downwardly by gas pressure to force the sample gathering material from the capsule into contact with the sea bottom. The sample gathering material has a density lower than the density of sea water and a freezing point higher than the temperature of the sea water whereby the sample gathering material freezes, occludes sea bottom material, and floats to the surface of the water.

Keywords: Instrument deployment; Sampler, biota; Sampler, seabed grab

U.S. Cl. X.R. 73-425



3,683,838

MOORING DEVICE FOR FLOATING BOAT HOIST

Byron L. Godbersen, 710 Circle Dr., Ida Grove, Iowa
Filed March 8, 1971, Ser. No. 121,650
Int. Cl. B63b 21/00

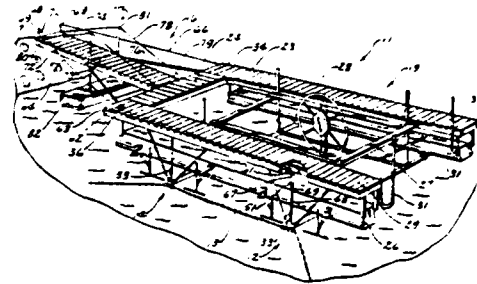
U.S. Cl. 114-230

10 Claims

A novel mooring device for floating equipment, such as boat hoists and boat docks, is provided herein which is especially useful on variable waters. This mooring device comprises first means mounted on opposing sides of the equipment for releasably securing a chain therein and, in alignment therewith, chain guiding means. The chains are secured at their respective ends to the shore and the bottom of the body of water and pass through the first means and the guiding means. A line is secured to the first means and utilized to release the chains secured therein thereby allowing the floating equipment to be readily relocated by one man as the water level in the body of water changes.

Keywords: Pier, floating; Small-craft pier; Small-craft service structure

U.S. Cl. X.R. 114-0,5F



3,684,050

METHOD AND APPARATUS FOR ACOUSTIC ENERGY GENERATION IN MARINE EXPLORATION

Roy C. Johnston, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.
Filed Jan. 2, 1970, Ser. No. 35
Int. Cl. G01v 1/38

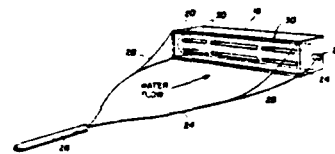
U.S. Cl. 181-5H

16 Claims

The invention is directed to structural bodies adapted to be towed through water by a seismic exploration vessel. Physical characteristics of the body are varied between a first mode wherein a relatively sharp discontinuity occurs in the velocity of water passing over the structural body and a second mode wherein the relatively sharp discontinuity is reduced. Various embodiments include varying the physical orientation of the body with respect to the direction of towing, varying the degree of resiliency of the towed body, varying the speed of towing of the body through the water, and varying the dimensional size of the body during towing.

Keywords: Seismic hydraulic acoustic transmitter

U.S. Cl. X.R. 340-7R; 340-15; 340-17



3,684,095

BARGE BASED SKIMMING SYSTEM FOR OIL SLICKS

Ray R. Ayers, 12522 Shepherd's Ridge Drive, Houston, Tex.
Filed Sept. 8, 1970, Ser. No. 70,097
Int. Cl. C02b 9/02

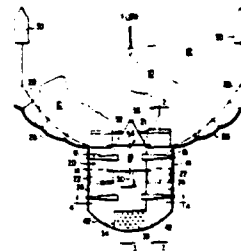
U.S. Cl. 210-242

4 Claims

A barge based skimming system for oil slicks and method for use thereof wherein the oil phase is concentrated relative to the water phase prior to its introduction into a final separating compartment wherein the oil is reclaimed in a conventional manner. A barge mounted wave reflector and boom arrangement diverts oil and water into open bottom chutes positioned on either side of a barge. The wave action is damped at the upstream end of the chutes and a skimming operation is performed downstream thereof to divert floating oil upwardly onto a shelf-like structure while allowing the underlying water to continue its passage through the open bottom chute. The shelf structure then directs the oil to a relatively quiescent area defined by a separating container at the rear of the barge where a second separating operation is conducted and the oil reclaimed.

Keywords: Pollutant collection; Pollutant removal watercraft

U.S. Cl. X.R. 210-DIG.21



3,684,680
ELECTRODES FOR ELECTROLYTIC OR CATHODIC
ANTICORROSION PROTECTION

Bernard Marie Louis Heuze, Boulogne, France, assignor
to Societe d'Etudes Contre la Corrosion (SECCO),
Paris, France

Filed Jan. 8, 1971, Ser. No. 104,974

Int. Cl. C23f 15/00

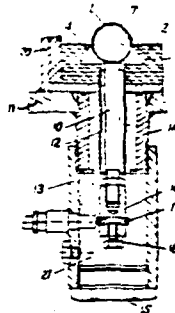
U.S. Cl. 204-196

6 Claims

This invention relates to electrodes for use in cathodic or electrolytic anticorrosion protection, particularly for protecting objects sited in sea water, of the kind comprising one or more tubes made of a suitable metal, such as titanium or tantalum, covered by an active layer of another suitable metal, such as platinum or rhodium. According to the invention, this tube or tubes is/are perforated and housed in a groove of a base member of insulating material, the interengagement being effected by means of an electrically insulating sealing material which penetrates through the perforations in the tube or tubes. Advantageously, the active layer covers only part of the tube. The groove is preferably of such shape as to provide a positive interlock, e.g. it is of dovetail section and, to enhance the anchoring effect, one or more wires passing through opposed perforations in the tube is/are embedded in the sealing material outside the tube.

Keywords: Cathodic protection; Corrosion prevention

U.S. Cl. X.R. 204-286; 204-290F; 204-297R



AUGUST 22, 1972

3,685,291
POLLUTION FREE ELECTRIC POWER AND WATER
PRODUCING STATION UTILIZING THE KINETIC AND
POTENTIAL ENERGY OF WATER WIND WAVES

William J. Fadden, Jr., 1005 W. 96th St., Kansas City, Mo.

Filed Oct. 1, 1970, Ser. No. 77,279

Int. Cl. E02b 9/08

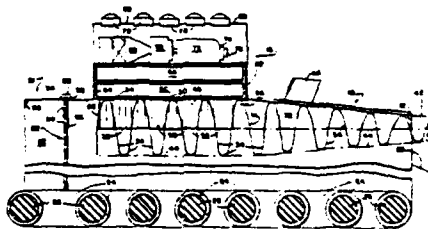
U.S. Cl. 60-57 T

11 Claims

An electric power station producing fresh water as a by-product by a dehumidification process, utilizing the kinetic and potential energy of water wind waves common to large bodies of water, comprising a wave energy converter including a reception channel and an automatically adjustable standing wave basin, which augments the inherent potential energy of the waves by converting extant kinetic energy therein into potential energy, a wave energy extraction system comprising a plurality of vertical chambers having open bottom ends located approximately coincident with the theoretical wave nodal line and having upper ends, check valved to admit ambient air as the water level therein descends, and to allow to be discharged therefrom as the water level therein rises, an intake manifold admitting ambient air to the chambers, an exhaust manifold for collecting exhausted air under pressure, a refrigerant coil system for extracting water from the exhausted air, and a power conversion system for utilizing the exhausted air under pressure as the prime mover to create electrical energy. The process occurs at or near ambient temperature, thereby minimizing entropy increase loss in the entire system.

Keywords: Electrical generator; Power, wave

U.S. Cl. X.R. 60-8; 60-62; 417-100



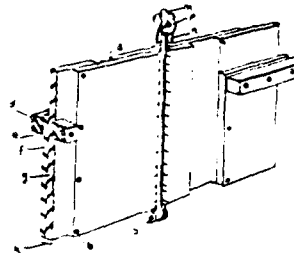
3,685,296
ELASTOMERIC OIL SLICK BOOM
 Theodore Oscar Bogrosian, 8 Kathleen Place, Somerville, N.J.
 Filed Aug. 15, 1972, Ser. No. 752,908
 Int. Cl. E02b 15/04

U.S. Cl. 61-1 F

2 Claims

A buoyant barrier boom which preferably typically comprises a relatively rigid sheet of asbestos rubber of about 10 percent to about 20 percent styrene-butadiene rubber content by weight, having a closed cell sponge attached to both faces of the sheet in a position whereby at least two-thirds of the sheet is below water level when floated in water in an erect position substantially vertical to the surface of the water, the portion of the sheet located substantially below water level being laminated with an additional sheet of the rubber-asbestos material in order to provide any additional weight necessary to maintain the structure in an upright position, and in order possibly to provide additional strength, the sheet additionally having attached to each end of the boom a flexible compressed rubber sheet having about a 60 percent to about 70 percent content of styrene-butadiene rubber, each of the laminated sheets being about one-eighth inch thick, the sponge material being partially enclosed by the rubber asbestos sheeting of a minor thickness to protect the sponge against abrasion, an anchoring means for restraining the boom in a relatively fixed position in water, and a removable clamp for pinching together two flat and overlapped surfaces of the flexible compressed rubber sheet whereby two or more of the booms may be easily attached in series.

Keywords: Pollutant, surface barrier



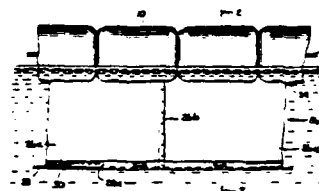
3,685,297
APPARATUS FOR CONFINING FLOATING MATERIALS
 Walter Juodis, Mishawaka, Ind., and George J. Gauch, Greenville, R.I., assignors to Uniroyal, Inc., New York, N.Y.
 Filed Dec. 7, 1970, Ser. No. 95,583
 Int. Cl. E02b 15/04

U.S. Cl. 61-1 F

33 Claims

An apparatus in which detachably connected floats form a barrier on the surface of a liquid for confining materials i.e. pollutants floating thereon. A plurality of adjacent floats are longitudinally arranged in an end-to-end relation. The end wall of at least one of the floats has a movable portion which is biased in a longitudinal direction toward the corresponding end wall of the next adjacent float so as to form a seal between adjacent floats. Each of the opposed end walls includes a portion adjacent the movable portion thereof for operatively securing together the floats, and for preventing the movable portions from moving apart further than a predetermined distance so as to maintain the movable portions in sealing engagement.

Keywords: Pollutant, surface barrier



AUGUST 29, 1972

3,686,811

SPACED MULTI-WALL CONSTRUCTION UNIT

Charles W. Hayes, 2334 Haldare St., Houston, Tex.

Filed Feb. 9, 1970, Ser. No. 9,657

Int. Cl. E04b 1/22; E04b 7/22

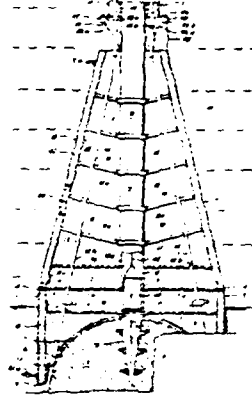
U.S. Cl. 52-233

7 Claims

Keywords: Offshore construction; Offshore platform, fixed; Offshore storage tank, submerged; Seabed foundation

U.S. Cl. X.R. 52-249; 52-426

A construction unit for constructing large pressure vessels such as offshore platforms and other pressure vessels which are subjected to high internal and/or external pressures wherein the construction unit comprises a multi-wall structure having a plurality of laterally spaced walls joined together at their upper and lower ends, respectively, and at their opposite sides to form an enclosure, and having a plurality of tensioning means for prestressing the construction unit prior to filling the enclosure with aggregate, concrete, grout or other suitable substantially incompressible material. The invention also includes the method of erecting off-shore vessels constructed of the spaced multi-wall construction units.



3,686,869

BUOYANT BARRIER AND METHOD FOR INSTALLING THE SAME

James E. Mauvel, Belle Terre, N.Y., assignor to Versatech Corporation, New Canaan, N.Y.

Continuation-in-part of Ser. No. 857,792, Sept. 15, 1969. This application March 5, 1971, Ser. No. 121,275

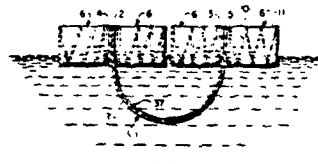
Int. Cl. E02b 15/04

U.S. Cl. 61-1 F

5 Claims

Keywords: Pollutant, surface barrier

A buoyant barrier, for confining oil spills and the like, comprises an elongated sheet of flexible material and a plurality of resiliently collapsible air chambers secured to the sheet and arranged in two series each extending along a different side edge portion thereof, the arrangement being such that the barrier can be flattened and wound on a reel, for storage and transport, and unwound from the reel and deployed on the surface of a body of water when in use. When the barrier is deployed, the inflated air chambers afford buoyant support, and the sheet extends in trough-like fashion to define a water chamber.



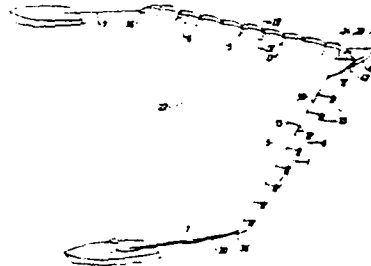
3,686,870
**ARRANGEMENT IN FLEXIBLE FENCES FOR
ENCLOSING IMPURITIES FLOATING ON WATER**
Erling G. E. Blomberg, Vastergatan 3 A 411, 23 Goteborg,
Sweden

Filed Oct. 24, 1969, Ser. No. 869,153
Claims priority, application Sweden, Oct. 24, 1968,
14366/68; Feb. 12, 1969, 1893/69; July 4, 1969, 9557/69
Int. Cl. E02b 15/04, 3/04
U.S. Cl. 61-1 F 10 Claims

A sick confining boom having an elongated flexible body means with upwardly extending portion to which floats are attached supporting said portion above the surface of a body of water and a downwardly extending portion to which weights are attached to extend said second portion below said water surface, a stress relieving rope connected at spaced apart intervals along said body means by connecting means extending laterally of said body means whereby said boom will retain impurities floating on said water surface.

Keywords: Pollutant collection; Pollutant, surface barrier

U.S. Cl. X.R. 61-5; 210-DIG.21



3,686,873
CONSTRUCTIONAL WORKS
Henri C. Vidal, 17, rue Armengaud, 92 Saint-Cloud, France
Continuation-in-part of Ser. No. 810,883, Jan. 10, 1969,
abandoned, which is a division of Ser. No. 354,947, March 26,
1964, Pat. No. 3,421,326. This application May 25, 1970, Ser.
No. 39,956
Claims priority, application France, Aug. 14, 1969,
6927983

Int. Cl. E02d 5/20 25 Claims
U.S. Cl. 61-39

Cladding for the outer surface of a reinforced earth structure comprising reinforcements embedded in a mass of particles. The cladding comprises cladding elements having a generally plane configuration which are so adapted and arranged in adjacent relation to each other that the cladding is capable of deforming in directions parallel to the planes of the cladding elements. Methods of connecting the cladding elements to the reinforcements to form a combined cladding and reinforced earth structure are also described.

Keywords: Bulkhead

U.S. Cl. X.R. 61-49

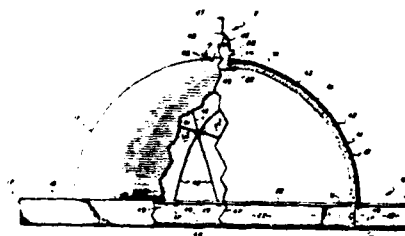


3,686,875
SUBMERGED STORAGE UNIT
George W. Morgan, Anaheim, Calif., assignor to Subsea
Equipment Associates Limited, Hamilton, Bermuda
Filed May 1, 1970, Ser. No. 33,763
Int. Cl. E02d 29/00
U.S. Cl. 61-46 7 Claims

The unit has a concrete dome fixed to a base also made of concrete. The dome has interlaced prestressed wire ropes, or cables, placing the dome in compression thereby allowing the dome to withstand the tension force resulting when the unit is stored with a fluid lighter than water. The cables are arranged preferably in a predetermined pattern to allow efficient use of material.

Keywords: Offshore storage tank, submerged

U.S. Cl. X.R. 52-80; 52-227



3,686,876

REMOVABLE PIER CONSTRUCTION

James E. Muschell, 111 N. Main St., Cheboygan, Mich.
Filed May 11, 1971, Ser. No. 142,269
Int. Cl. E02b 3/20

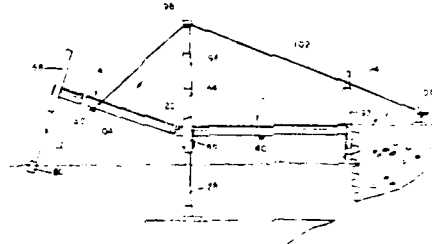
U.S. Cl. 61-48

13 Claims

A removable pier having at least two sections pivotably joined end to end and extending from a footing on a shore into a body of water. The pier sections are removably supported on permanent footings for stability. Booms having cable guides are removably mounted on leg extensions of the inner pier section. Cables, driven by winches, pass through the cable guides on the boom and engage the outer pier section for its removal from the water by rotation about its pivotable connection with the inner pier section. The booms are transferred to mounts on the shore at the sides of the pier for removal of the inner pier section from the water with the outer pier section in overlying position. The outer pier section is preferably slightly shorter than the inner pier section so that both pier sections can be stored in upright position on the shore ready for repositioning in the water.

Keywords: Pier, fixed; Pier, mobile; Seabed foundation; Small-craft pier

U.S. Cl. X.R. 114-71



3,686,877

SONIC METHOD AND APPARATUS FOR INSTALLING OFF-SHORE CAISSONS FOR OIL OPERATIONS AND THE LIKE

Albert G. Bodin, 7877 Woodley Ave., Van Nuys, Calif.
Filed Feb. 18, 1971, Ser. No. 116,396
Int. Cl. E02d 7/18, 19/00

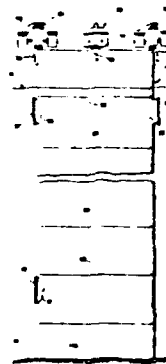
U.S. Cl. 61-53.5

7 Claims

A relatively wide diameter caisson member is placed in the water in a desired off-shore position with the bottom end thereof being forced brased into the sediment by virtue of the weight of the caisson, and with the open opposite end thereof protruding above the surface of the water. A plurality of sonic oscillators are coupled to the portion of the caisson above the surface. These oscillators are each adapted to provide vibrational energy to the casing principally along the longitudinal axis thereof with a minimum component of transverse vibration. The oscillators, each of which is separately driven and capable of delivering only a portion of the power needed to effectively drive the caisson, are driven at a frequency such as to cause resonant elastic vibration of the caisson in a predominantly single longitudinal mode, the separate oscillators tending to adjust both in frequency and phase at this resonant frequency. The caisson is effectively driven into the bottom by virtue of the vibrational energy, the bottom sediment acting on the heavy compression column to damp out unwanted vibrational modes which would otherwise tend to wastefully dissipate sonic energy.

Keywords: Offshore caisson; Offshore construction; Pile driver, vibratory

U.S. Cl. X.R. 61-34; 61-41



3,686,886

**PLANT FOR THE MANUFACTURE OF FLOATING
CONCRETE STRUCTURES IN A BODY OF OPEN WATER**

Hans Christer Georgii, 42, Rindögatan, Stockholm, Sweden

Filed Dec. 22, 1969, Ser. No. 887,224

Claims priority, application Sweden, Dec. 20, 1968,
17706/68

Int. Cl. E02d 29/06

U.S. Cl. 61-46.5

12 Claims

Keywords: Offshore construction; Offshore
platform anchor; Offshore
platform, floating

U.S. Cl. X.R. 61-82; 114-.5F

A plant for the manufacture of floating concrete structures in open and substantially unsheltered bodies of water, comprising a concrete ring floating in the water with its axis normally substantially vertical and its upper end above the water surface. The wall structure of the concrete ring includes a plurality of circumferentially spaced, pressure-tight, preferably cylindrical cavities extending in the axial direction of the ring. At least some of these cavities are adapted to serve as ballast and trimming tanks which can be filled with water to a variable extent, whereby the buoyancy, the floatation height and the attitude of the concrete ring in the water can be controlled. The total volume of the cavities is such that the total displacement of the concrete ring exceeds substantially the total dead-weight of the ring. The water area enclosed by the concrete ring is efficiently protected against wave motions, currents and winds, wherefore the manufacture of floating concrete structures can take place in this water area substantially without any disturbances from weather forces. The upper ring-shaped end of the floating concrete ring supports all those apparatuses, equipments, devices and facilities that are necessary for the production, such as concrete mixing stations, cranes, elevators, conveyors, electric power plants, compressed air plants, pump stations, control stations for the control of the ballast and trimming tanks of the concrete ring, workshops, crew spaces etc. Some of the large cavities in the wall structure of the floating ring can also be used as store spaces for materials necessary for the production, such as cement, gravel, sand, reinforcement materials etc. The concrete ring is moored through a large number of mooring ropes to an anchor resting upon the bottom of the body of water. The anchor consists preferably of a concrete ring having a wall structure including a plurality of circumferentially spaced, sealed, pressure-tight cavities adapted to serve as ballast tanks which can be filled with water to a variable extent for determining the total weight of the anchor ring and thus the anchoring force thereof. Preferably, the total volume of the ballast tanks in the anchor ring is such that the displacement of the anchor ring in the water exceeds the dead-weight of the anchor ring, whereby this can be brought to a floating position in the surface of the water in that the ballast tanks are emptied. In this way the anchor ring can be towed in a floating position to the intended site of use.



3,686,387
**SCOUR CONTROL SYSTEM FOR SUBMERGED
 STRUCTURES**
 Peter Bruce, 10 Torphichen Place, Edinburgh, EH3 8DU, Scot-
 land
 Filed Jan. 13, 1970, Ser. No. 2,501
 Claims priority, application Great Britain, Jan. 17, 1969,
 2,927 69; Jan. 25, 1969, 4,351.69
 Int. Cl. E02h 3/00
 U.S. Cl. 61-63 17 Claims

A scour control system for establishing and maintaining convergent fluid flow conditions at the surface of a submerged particulate bed circumjacent to a submerged structure seated on the bed so that particle loss from the surface of the bed, within a closed region surrounding the structure, is eliminated as being the normal consequence of externally incident unidirectional fluid flow past the submerged structure at the particulate bed surface.

Keywords: Offshore platform, leg; Pump;
 Seabed scour protection

U.S. Cl. X.R. 61-2



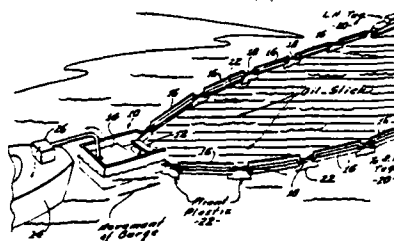
SEPTEMBER 5, 1972

3,688,506
**APPARATUS FOR REMOVING OIL SLICK FROM WATER
 SURFACES**
 Alphonse E. Marcocchia, 2239 S. Camden Ave., Los Angeles,
 Calif.
 Continuation-in-part of Ser. No. 11,538, Feb. 16, 1970,
 abandoned. This application Dec. 28, 1970, Ser. No. 101,766
 Int. Cl. E02h 1/104; B01d 21/00
 U.S. Cl. 61-1 F 8 Claims

A barge-like float having a forward end shaped to be in skimming contact with the surface of the water. Two series of booms of special construction are attached to the forward end of the float, and the booms extend out from the barge in substantially an inverted V formation. The booms are intercoupled with one another in a particular manner, so that the booms may ride ocean swells without turning over, and without permitting the oil slick to seep under the booms.

Keywords: Pollutant collection; Pollutant
 removal watercraft; Pollutant,
 surface barrier

U.S. Cl. X.R. 210-242



3,688,508

SHEET PILING CONNECTORS

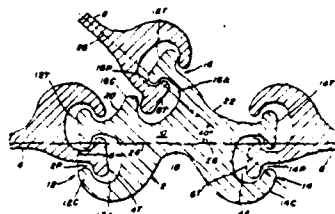
Rene A. Taylor, Mount Lebanon Twp., Allegheny Cty., Pa., assignor to United States Steel Corporation,
Filed Oct. 21, 1970, Ser. No. 82,667
Int. Cl. E02d 5/08

U.S. Cl. 61-62

3 Claims

An extruded steel connector for connecting three sheet piling has three spaced apart appendages radiating from a solid core. The angle between the appendages may vary, but should not be less than 30°. Each appendage includes a C-arm, spaced from a T-arm to form an oval opening having a restricted passage to the outer periphery of the connector. The T-arms of the pilings are received one in each oval opening. The core has a concave arcuate outer portion between adjacent appendages. The distance between the bottoms of adjacent openings is a maximum of four times the depth of the openings as measured from the outside of the connector.

Keywords: Pile section connection; Pile, sheet; Pile, steel



3,688,509

METHOD OF ASSEMBLING A SHEET PILING IN THE EARTH FROM SHEET PILE SECTIONS; AS WELL AS A SHEET PILE SECTION SUITABLE FOR APPLICATION IN THIS METHOD

Abraham Francois Van Weele, Waddinxveen, Netherlands, assignor to N.V. Tot Aansluiting van Werken voorheen H. J. Nederhorst, Gouda, Netherlands

Filed Nov. 18, 1970, Ser. No. 90,617

Claims priority, application Netherlands, Nov. 22, 1969, 6917636

Int. Cl. E02d 5/16

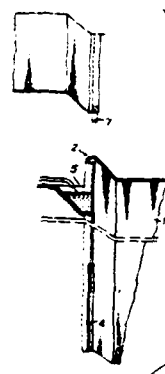
U.S. Cl. 61-62

10 Claims

A method of assembling a sheet piling in the earth from sheet pile sections which are each provided on either side with a locking channel and which are successively introduced into the earth. Prior to the introduction of a sheet pile section into the earth, its locking channel which is to co-operate with the adjacent locking channel of the next sheet pile section is sealed on the lower side as well as in the lower area of the upright open side. During the introduction of this sheet pile section into the earth a liquid having a low internal friction and a high specific gravity is fed into said locking channel, said liquid keeping the locking channel filled to approximately the level of the ground surface. This liquid is forced out of the locking channel when the next sheet pile section is being introduced into the earth.

A sheet pile section provided on either side with a locking channel, wherein one of said locking channels is sealed on its lower side by a lower end plate and on the upright open side by an upright side plate, which extends from the lower side of the locking channel over part of the height of said locking channel.

Keywords: Pile section connection; Pile, sheet; Pile, steel



3,688,510

SUBMARINE ROCK PLACING TRAVELER

James J. Keating, Richmond, Calif., assignor to Peter Kiewit Sons' Company, Omaha, Nebr.

Filed Sept. 3, 1971, Ser. No. 177,656

Int. Cl. E02d 15/10, 27/46

U.S. Cl. 61-63

17 Claims

A ballast placing system for underwater pipe lines makes use of a traveler vehicle operating on the ocean floor to place aggregate material at the sides of a pipe line as ballast. The vehicle has a frame including side members which straddle the pipe line and a central structure located above the pipe line interconnecting the side members. Adjacent the aft end of each side member is a hydraulic activated Caterpillar Drive unit for moving the vehicle in a forward direction and forward of the Caterpillar Drive unit is a supporting sled and a guide structure for aligning the vehicle relative to the pipe line. At the top of the central structure is a hopper from which extends a downwardly directed chute which divides into two branch chutes, one located on each side of the pipe.

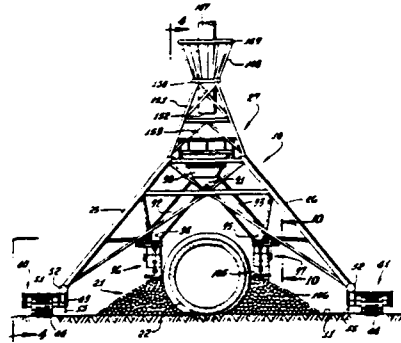
A screed device at the lower end of each branch chute gages the amount of aggregate which is deposited by each respective branch chute. Caterpillar treads of the drive unit are actuated to move the vehicle progressively forward as promptly as aggregate deposited at the sides of the pipe line reaches a predetermined level.

The hopper is supplied through a telescoping feed chute from a tender anchored at the surface, above and in alignment with the pipe line. The tender is pulled forward on anchor cables at a pace matching travel of the vehicle on the ocean floor and a crane on the tender lifts aggregate from a supply barge and discharges it into the feed chute.

Hydraulic circuits for operating parts of the system stem from a control panel carried by the tender and are supplied by a pump on the tender.

Keywords: Seabed material placement; Seabed pipeline placement; Seabed scour protection

U.S. Cl. X.R. 61-46; 61-72.1; 61-72.3; 222-176



3,688,511

METHOD OF AND APPARATUS FOR FLUSH-JET EMBEDDING STRUCTURAL ELEMENTS AND FOR SUCKING OFF GROUND MATERIAL

Rudolf Harmsdorf, Schillerstr. 45, Hamburg-Altona, Germany

Filed July 8, 1970, Ser. No. 53,189

Claims priority, application Germany, Aug. 18, 1969, P 19 41 993.3

Int. Cl. E02d 5/00; B05b 7/28

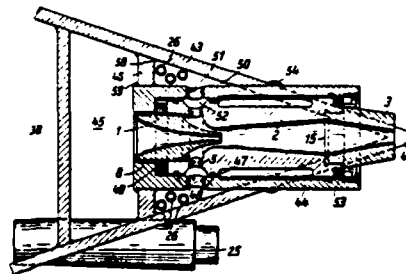
U.S. Cl. 61-72.4

4 Claims

The method of the invention consists in directing a jet of a mixture of water and air into the ground whereby the ground material is loosened and removed. A ditch is formed in this way and an element is laid into the ditch. The apparatus for performing this method has water jet pumps arranged at the side adapted to penetrate into the ground. The method and apparatus are especially suited for laying cables and pipes in a water bed.

Keywords: Seabed cable plow; Seabed pipeline placement; Seabed trencher

U.S. Cl. X.R. 37-41; 37-62



3,688,722

HOPPER BARGE

Bartele Van Der Werff, Capelle an den IJssel, Netherlands, assignor to A. Vuyk & Zonen's Scheepswerven, N.V., Capelle a/d IJssel, Netherlands

Filed Sept. 10, 1970, Ser. No. 71,092

Claims priority, application Netherlands, Sept. 12, 1969, 69/3929

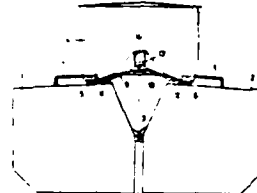
Int. Cl. B63b 35/30

U.S. Cl. 114—29

6 Claims

A bottom dump hopper barge having a platform and a pair of longitudinal, transversely hinging pontoons is provided with improved means for maintaining the platform in virtually the same position relative to the vertical longitudinal median plane between the pontoons. The means may take the form of linkage system, hydraulic piston-and-cylinder assemblies, rack-and-pinion means, or guide rods or plates rigidly connected to the platform and guided in bent zones of facing walls of the pontoons.

Keywords: Hopper barge



3,688,729

DYNAMIC FENDERING SYSTEM

William A. Tam, Westmont, Ill., assignor to Chicago Bridge & Iron Company, Oak Brook, Ill.

Filed Oct. 15, 1970, Ser. No. 80,842

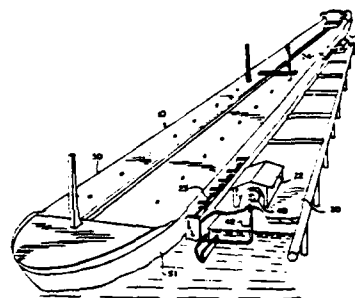
Int. Cl. B63b 21/00

U.S. Cl. 114—230

7 Claims

This invention relates to a new and unobvious system for mooring a vessel by means of momentum transfer which induces a current and creates a pressure differential whereby the vessel is drawn toward and held to the mooring facility.

Keywords: Pier fender



3,688,730

TOWABLE UNDERWATER VESSEL

Dieter Ortleib, Unteruhldingen; Joachim Thomas; Horst Stockburger, both of Immenstadt; Erich Birkhold, and Horst Kling, both of Friedrichshafen, all of Germany, assignors to Dornier System GmbH, Friedrichshafen, Germany

Filed Feb. 24, 1970, Ser. No. 13,676

Claims priority, application Germany, Feb. 25, 1969, P 19 09 242.3

Int. Cl. B63b 21/00

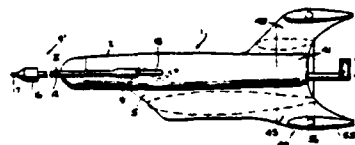
U.S. Cl. 114—235 B

8 Claims

The hull is shaped as a transverse drive producing body with a small aspect ratio while depth steering equipment is mounted on the stern. The vessel has a water displacement which creates a static residual lift force should the power to the vessel be shut off for any reason. This allows the vessel to surface automatically. The depth steering equipment is controlled over a coaxial tow cable.

Keywords: Towed body depth control; Towed vehicle

U.S. Cl. X.R. 114-16R



3,688,909

FLOATING SELF ADJUSTING SKIMMER

Paul E. Titus, Houston, Tex., and James R. Hanson, Martinez, Calif., assignors to Shell Oil Company, New York, N.Y.

Filed June 4, 1970, Ser. No. 43,461

Int. Cl. C02b 9/02

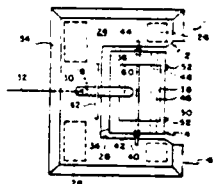
U.S. Cl. 210-242

9 Claims

There is disclosed a skimming mechanism for removing all or part of a first liquid from the surface of a second liquid. A pivoted receptacle having a weir is buoyed to position the weir adjacent the interface of the liquids. Liquids accumulating in the receptacle are withdrawn for disposal. A stabilizing member extends around a substantial portion of the periphery of the skimmer to prevent submergence of the weir due to wave or current movement of the liquids.

Keywords: Pollutant, suction removal

U.S. Cl. X.R. 210-DIG.21



3,689,395

CATHODIC PROTECTION SYSTEM AND DELAY-ACTIVATION ANODE

Floyd E. Blount and Wallace B. Allen, Dallas, Tex., assignors to Mobil Oil Corporation

Filed June 20, 1969, Ser. No. 835,023

Int. Cl. C23f 13/00

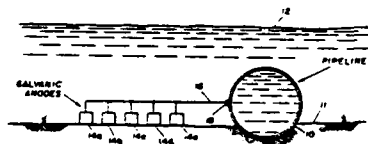
U.S. Cl. 204-197

4 Claims

The specification discloses an extended lifetime cathodic protection system employing sequentially activated galvanic anodes. All of the anodes are connected by means of an electrical conductor to the metallic structure to be protected so that as one anode is consumed an additional anode or anodes are activated in sequence to provide continuous electrical current flow over any desired period of time. A delay-activation anode is disclosed with a body of anode material enclosed by a hermetic casing which includes a relatively corrodible material such as iron. The corrodible material is chosen to provide a predetermined corrosion rate when immersed in a particular electrolyte, whereby an opening is created to expose the anode material at a desired delay time.

Keywords: Cathodic protection; Corrosion prevention

U.S. Cl. X.R. 136-90; 204-148



3,689,875

FLEXIBLE GEOPHONE

Richard J. Kostelnicek, Houston, Tex., assignor to Esso Production Research Company

Filed May 27, 1971, Ser. No. 147,490

Int. Cl. G01v 1/16

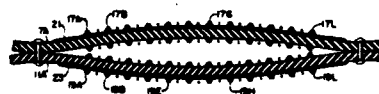
U.S. Cl. 340-17

10 Claims

A pressure sensitive seismic detector is formed of at least two elongated sheets or layers of flexible, rubberous material having particulated magnetic material embedded therein. The particulated magnetic material is preferably barium ferrite. The layers are connected together at spaced apart locations and magnetized across the width thereof so as to form a plurality of parallel bar magnets along the length thereof with the poles of adjacent magnets reversed. Coils are wound between the bar magnets on at least one of the layers. Preferably, the sense of winding of adjacent coils is reversed, and the magnets formed in adjacent flexible sheets are aligned so that they repel each other. To form a hydrophone, the apparatus is encased in a thin flexible bag or enclosure and positioned in a liquid filled cable housing. In one embodiment, magnetic metal foil is affixed to the nonengaging surfaces of two adjacent layers of rubberous material.

Keywords: Seismic hydrophone; Seismic streamer cable

U.S. Cl. X.R. 340-7; 340-261



SEPTEMBER 12, 1972

3,690,108

STABLE OFFSHORE STRUCTURES

William A. Tam, Westmont, Ill., assignor to Chicago Bridge & Iron Company, Oak Brook, Ill.

Filed June 15, 1970, Ser. No. 46,403

Int. Cl. E02b 3/22; B63b 43/18

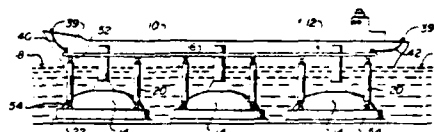
U.S. Cl. 61-46

10 Claims

Stable offshore structures especially suitable for use adjacent undersea storage facilities are provided having a horizontally extending buoyant member pivotally interconnected by universal joint means with stable sub-surface anchoring means by vertically extending support means.

Keywords: Offshore mooring structure;
Offshore platform, floating;
Offshore storage tank, emergent

U.S. Cl. X.R. 61-48; 114-230



3,690,110

REPAIRING OR REHABILITATING STEEL SUPPORTED H-PILES

George C. Wiswell, Jr., 1014 Pequist Rd., Southport, Conn.

Filed April 9, 1970, Ser. No. 26,962

Int. Cl. E02d 5/40, 5/60

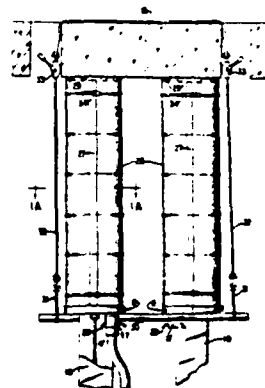
U.S. Cl. 61-54

7 Claims

In order to apply reinforced concrete to a portion of a steel pile, a reinforcing cage is attached to the pile surrounding that portion and is enclosed by a two-piece cylindrical form pulled tightly upwardly against the undersurface of the pile cap and having its lower end closed by a bottom plate. Concrete is pumped upwardly through the bottom plate to displace the water within the form.

Keywords: Concrete form; Pile, steel;
Structure repair

U.S. Cl. X.R. 25-118; 264-32



3,690,180
DREDGER VESSEL AND A METHOD OF DETERMINING
THE LOADED WEIGHT OF SEDIMENTED MATERIAL IN
A DREDGER VESSEL

Romke Van Der Veen, Jutphaas, Netherlands,
assignor to N.V. Ingenieursbureau voor
Systemen en Octrooien "Spanstaal",
Rotterdam, Netherlands

Filed Jan. 30, 1970, Ser. No. 7,012
Int. Cl. G01F 23/14, G01a 9/04

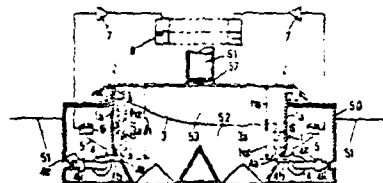
U.S. Cl. 73-432 R

30 Claims

When measuring the quantity of sand in a dredger vessel which sand is sedimented from a suspension of sand and water, the height of the sedimented sand is determined by means of inaccurate mechanical sensitive means acting on the surface of the sedimented sand. An accurate method of measuring is provided in which fluid, such as water, is so fed at pressure, into the hold at at least one measuring place provided in said hold, that the fluid fluidizes the compacted material sedimented at the measuring place, the pressure at the measuring place being picked up when said material is in fluidized state, so that the pressure picked up corresponds with the weight of the column of dredger spoil and water, from which the weight of the loaded material at the measuring place is derived.

Keywords: Dredge-spoil measurement;
Dredge-spoil transport

U.S. Cl. X.R. 73-294; 73-438



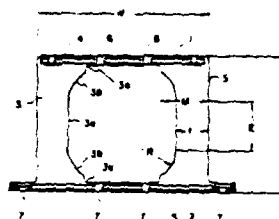
3,690,280
FENDER FOR LARGE SHIP
Jiro Naraba, Tokyo, Japan, assignor to Seibu Gomu Kogyo
Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed Sept. 14, 1970, Ser. No. 71,722
Int. Cl. B63b 21/00

U.S. Cl. 114-219

1 Claim

In a rectangular tubular fender for large ship, made of elastic material and composed of a buffer, a fixture and two supports provided between said buffer and said fixture, the present invention contemplates an improvement therein wherein the exterior surfaces of said supports being made parallel to each other, the interior surfaces of said supports being flat and parallel to said exterior surfaces in the middle portion, the adjacent parts of said middle portion to said buffer and said fixture being curved, and the junctions between said curved portion and said buffer or fixture being depressed with a notch.

Keywords: Pier fender



3,690,403
ACOUSTIC ENERGY SOURCE UTILIZING THE WATER-HAMMER PHENOMENON

Billy W. Davis, Houston, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Jan. 2, 1970, Ser. No. 147

Int. Cl. G01v 1/14

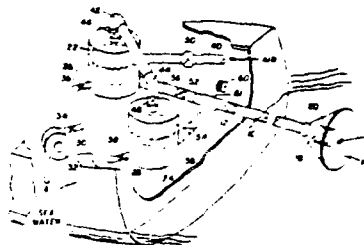
U.S. Cl. 181-5 H

26 Claims

An elongated pipe is connected at an upper end to a pressurized fluid container and extends downwardly into water at the lower end. A valve is connected between the pressurized fluid container and the elongated pipe. A piston member is slidable within the elongated pipe. A diaphragm is connected at the submerged end of the pipe and includes seating structure for engaging the piston member. When the valve is opened, a high energy supply of fluid is directed against the piston member to force the piston member at high speed down the pipe into abutment with the seating structure. Compressional waves are thus created along the length of the elongated pipe, the diaphragm coupling the compressional waves into the adjacent water to create acoustic energy for use in marine exploration.

Keywords: Seismic hydraulic acoustic transmitter

U.S. Cl. X.R. 181-5A; 340-8; 340-14; 340-17



3,690,463
FLOATING SUCTION HEAD

John A. O'Brien, Rockville, Md., assignor to The United States of America as represented by the Secretary of the Navy

Filed July 13, 1971, Ser. No. 162,108

Int. Cl. C02b 9/02

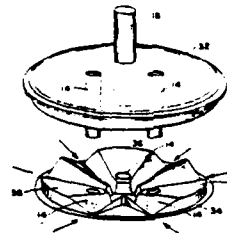
U.S. Cl. 210-242

5 Claims

Apparatus used for collecting spilled oil from the surface of the sea including primarily a floating suction head connected to a pump by a flexible hose. The oil-water mixture enter the head through a suction port, the latter being protected from debris by a series of screens.

Keywords: Pollutant, suction removal

U.S. Cl. X.R. 210-DIG.21



3,690,464
OIL RECOVERY VESSEL FOR THE REMOVAL OF OIL AND OTHER POLLUTING MATTER FLOATING ON THE WATER SURFACE

Karl Heinicke, An der Berner Au 1, 2000 Hamburg, 72, Germany

Filed June 15, 1970, Ser. No. 45,970

Int. Cl. C02b 9/02

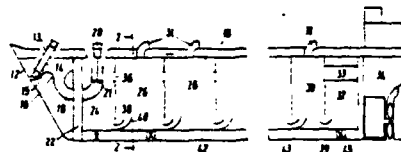
U.S. Cl. 210-242

2 Claims

A novel oil recovery vessel for removing oil and other floating impurities from the water surface, is provided with means for collecting such impurities, means for conveying said collected liquid impurities through the vessel and means for the discharge of redundant water from the vessel the conveying means keeping the emulsification of the removed impurities to a minimum despite a rather high operational throughput.

Keywords: Pollutant removal watercraft; Pollutant, suction removal; Pump

U.S. Cl. X.R. 210-DIG.21



3,690,790

**TIDE-POWERED UNIT AND FLOATING PLATFORM
UTILIZING SAME**

George H. Hooper, 2092 East Main Street, Bridgeport, Conn.

Filed Dec. 7, 1970, Ser. No. 95,543

Int. Cl. F04b 17/00, 35/00, 21/02, 39/10; F01b 19/00

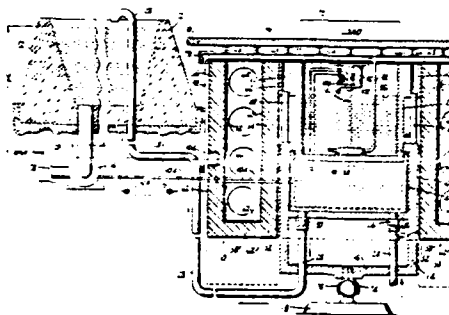
U.S. Cl. 417-331

9 Claims

A tide powered unit for generating electrical power, comprising a relatively large-diameter cylinder and piston therein, disposed with their axes vertical, the piston being capable of a raising and lowering movement through the open top of the cylinder. The lower portion of the cylinder is attached to a base or anchorage located on the bottom of a large body of water the level of which is influenced by tides. The piston is operatively connected to a float whereby both will rise and fall as the tide comes in and goes out. The cylinder has inlet and outlet passages which are valved to permit ingress of water into the cylinder as the piston rises, and to provide for egress of water from the cylinder as the piston descends. The outlet, through which the water leaves the cylinder, goes to a reservoir located above the high tide mark whereby the rise and fall of the tide causes a pumping of tide water into the reservoir. When the reservoir fills, the water stored therein can be used to turn hydroelectric generators for generating electric power. A multiplicity of such power units is shown as being disposed side by side beneath a large platform whereby the latter is supported by the floats of the units and can carry buildings, equipment and other facilities. Where the supported platform is sufficiently large, it functions also as an air strip for the landing and take-off of aircraft. The platform imperceptibly rises and falls with the tides whereby it is always at a given fixed level above the surface of the body of water. The large number of power units supporting the platform totalize to provide a large amount of ultimate hydroelectric power originating with the rise and fall of the tide. Automatically controlled water ballasts associated with the power units compensate for any unequal loading on the platform supported thereby.

Keywords: Offshore platform anchor; Offshore platform, floating; Power, tide; Pump

U.S. Cl. X.R. 92-98D; 417-568



3,691,516

**ACOUSTIC PULSE GENERATOR UTILIZING A
MECHANISM FOR CHANGING THE NATURAL
FREQUENCY OF OSCILLATION**

Walton Graham, Roslyn; Irving E. Melnick, Syosset, and Tullo De Filippis, Garden City, all of N.Y., assignors to Control Data Corporation, Minneapolis, Minn.

Filed Nov. 21, 1969, Ser. No. 878,776

Int. Cl. G01v 1/02

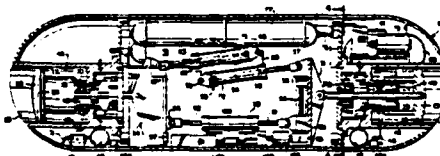
U.S. Cl. 340-8 R

29 Claims

An acoustic pulse generator for generating acoustic pulses of varying frequency in water is disclosed including a mechanically resonant structure, a drive mechanism for causing the mechanically resonant structure to oscillate, a mechanism for changing the natural frequency of oscillation of the mechanically resonant structure, and one or more transducers for transmitting the oscillations of the mechanically resonant structure to the water in which the acoustic pulse is to be generated.

Keywords: Seismic vibratory acoustic transmitter; Towed vehicle

U.S. Cl. X.R. 181-.5H



SEPTEMBER 19, 1972

3,691,573

SELF-POWERED SIGNAL BUOY

Gaetano J. Laudato, Jr., 2 Lamartine Place, Jamaica Plain, Mass.

Filed July 20, 1970, Ser. No. 56,348

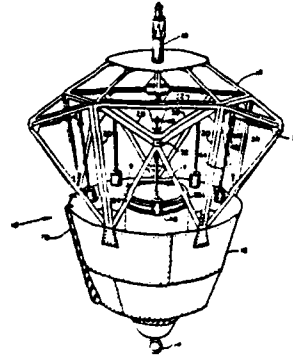
Int. Cl. B63b 51/00

U.S. Cl. 9-8.3 E

6 Claims

A signal buoy is provided with one or more pendulums operating an air compression system in which the pendulums swing with the motion of the buoy. Compressed air is stored in a charging tank until it reaches a preset pressure at which point it is released to drive an air turbine which in turn operates an electrical generator and through a voltage regulator charges batteries on the buoy. The battery, in turn, operates a signal lamp or other accessory equipment.

Keywords: Buoy, instrumented; Electrical generator; Power, wave



3,691,773

WATER BARRIER FLOTATION CURTAIN

Jon R. Ruhlman, Cleveland Heights, Ohio, assignor to Preformed Line Products Company, Cleveland, Ohio

Filed June 22, 1970, Ser. No. 48,323

Int. Cl. E02b 15/04, 3/06

U.S. Cl. 61-1

27 Claims

A water barrier flotation curtain for use in a body of water comprising a barrier having a sandwich-like construction, which is substantially vertical having an upper edge and a lower edge, a flotation means positioned within the barrier and adapted to float beneath the surface of the water, and an anchor attached to the lower edge of the barrier wherein the lower edge of the barrier substantially follows the contour of the floor of the body of water.

Keywords: Breakwater, floating; Pollutant debris; Pollutant, submerged barrier; Pollutant, surface barrier

U.S. Cl. X.R. 4-171; 61-4; 61-5



3,691,774

TRANSPORTABLE BREAKWATER

Carl G. Hard, 14 Springlane, Framingham, Mass.

Filed April 1, 1970, Ser. No. 24,748

Int. Cl. E02b 3/06

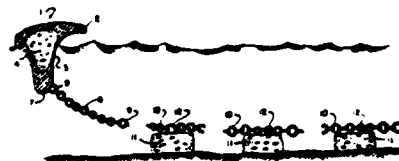
U.S. Cl. 61-5

4 Claims

The invention relates to a transportable breakwater comprising a plurality of floating units, each unit having a horizontal fin-like protrusion which rotates to a vertical position for intercepting waves when the unit is tipped leeward by wave action. Mooring blocks placed in tandem and the connecting chains permit the floating units to yield gradually to oncoming waves.

Keywords: Breakwater, floating; Buoy mooring system

U.S. Cl. X.R. 61-1F



3,692,650

CATHODIC PROTECTION SYSTEM

Harry J. Kipps, South Laguna Beach, and Thaddeus M. Donigian, Laguna Beach, Calif., assignors to Signal Oil and Gas Company, Los Angeles, Calif.

Filed Aug. 24, 1970, Ser. No. 66,339

Int. Cl. C23f 13/00

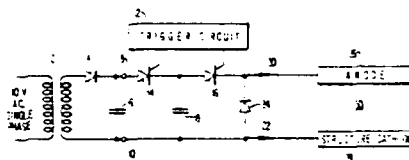
U.S. Cl. 204-147

10 Claims

A method and apparatus for cathodic protection of structures, such as well casing and pipe lines by the use of a pulsed voltage and continuous current. The width of the voltage pulses is sufficiently wide to permit acid ion conversion but not wide enough to permit undesirable chemical reactions. The pulse repetition frequency is made equal to the resonant frequency of the series circuit formed by the protected structure which acts as a cathode, the medium in which the structure is located, and an anode placed in the medium. The series circuit includes an inherent inductance between the anode and cathode and an inherent series capacitance known as the taffel double layer capacitance. By operating at the resonant frequency, maximum cathodic protection power is derived for a given input power. Further, the inductance between the anode and cathode causes a continuous current to flow after each voltage pulse has terminated.

Keywords: Cathodic protection; Corrosion prevention

U.S. Cl. X.R. 204-196



SEPTEMBER 26, 1972

3,693,195

APPARATUS FOR SURF GENERATION

George E. Richard, 6507 Seaside Walk, Long Beach, Calif., and Eugene D. Richard, 11570 Victory Blvd., Hollywood, Calif.

Filed July 20, 1970, Ser. No. 56,314

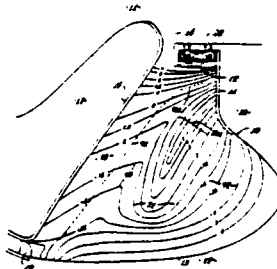
Int. Cl. E04h 3/16, 3/18

U.S. Cl. 4-172.16

15 Claims

A tapered enclosure for a body of water has a wave generator positioned in a relatively narrow and deeper end. In one form, the wave generator is a buoyant plunger mounted for vertical reciprocation within a chamber having a shorewardly facing opening. Through a cyclic control system, the plunger is driven in phase with the forces of gravity and buoyancy acting thereon, starting from a rest position through strokes of increasing amplitude until a desired steady state is attained to sequentially produce waves of a desired energy. Provision is made for varying the mass of the plunger and varying the input from a prime mover as a means of adjusting wave energy and frequency.

Keywords: Wave flume; Wave generator



3,693,272

FLOATING TOWER FOR UNDERWATER DREDGING

Paul Gariel, 3, rue Lesdiguières, 38-Grenoble, France

Filed April 29, 1970, Ser. No. 32,993

Claims priority, application France, April 30, 1969, 6912354; May 13, 1969, 6914340

Int. Cl. E02f 3/90

U.S. Cl. 37-63

3 Claims

A suction-dredging installation for operation at great depths and having considerably increased stability in rough water, comprising a suction nozzle in contact with the sea-bed and drawing in a mixture of water and materials, a pump installed in a floating tower of elongated form and a suction conduit coupling said suction nozzle to said pump, the tower being maintained in a vertical working position in the water by ballasting means, said pump being mounted near the lower extremity of the tower so as to obtain a great apparent depth of immersion, the pump being coupled to a delivery conduit which applies a back-pressure corresponding substantially to said depth of immersion so that the pump is capable of working without cavitation.

Keywords: Dredge, suction; Dredge-spoil transport; Offshore platform, floating; Pump

U.S. Cl. X.R. 37-72; 302-14; 417-103; 417-122



3,693,274

CLAM SHELL EXCAVATOR

Ugo Piccagli, 14202 Hay Meadow Dr., Apt. 167, Dallas, Tex.

Filed Oct. 13, 1970, Ser. No. 80,357

Claims priority, application Canada, Sept. 10, 1970, 092866

Int. Cl. B66c 3/02

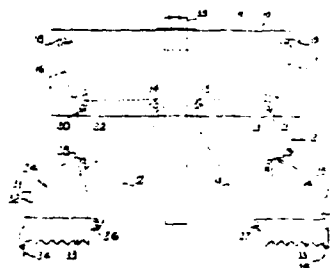
U.S. Cl. 37-187

2 Claims

A supporting frame carries a pair of pivoted arms which are movable toward and away from each other by fluid operators reacting between the arms and the frame. A pair of complementary bucket members are pivoted to lower end of the respective arms for movement toward and away from each other independently of the pivotal movement of the arms. The bucket members are moved by fluid operators reacting between the arms and the bucket members. A suction pipe extends through the frame between the arms for picking up material loosened by the bucket members.

Keywords: Dredge, suction; Dredge intake; Dredge, mechanical

U.S. Cl. X.R. 37-71; 37-188



3,693,360

ICE BREAKER FOR MARINE STRUCTURES

John E. Holder, 503 N. Central Expressway, Richardson, Tex.

Filed Oct. 2, 1970, Ser. No. 77,506

Int. Cl. E02b 15/02, B63b 35/12

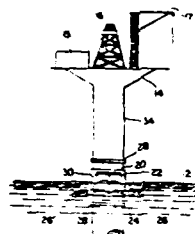
U.S. Cl. 61-46

10 Claims

An ice breaker for marine structures comprising a rotatably mounted plow member on an offshore platform and utilizing a vane member to position the plow member in the path of encroaching ice floes. Buoyant chambers vertically position the plow member so that the leading edge will be under or above the ice floe. High pressure fluids or mechanical saws can be used as cutting members to cut sections in the ice floe and allow the plow member to break the ice sections from the ice floe and force them above or below the remaining ice floe. High pressure jets may be located in apertures in the face of the plow member and/or located between the ice floe and the plow member. The cutting members are arranged to cut sections of ice resembling the vertical section of a truncated pyramid.

Keywords: Ice protection; Offshore platform, fixed; Offshore platform, leg; Offshore structure fender

U.S. Cl. X.R. 61-1; 114-40; 114-42; 299-24



3,693,361

METHOD AND APPARATUS FOR TRANSPORTING AND LAUNCHING AN OFFSHORE TOWER

Albert M. Koehler, Houston, Tex., assignor to Brown & Root, Inc., Houston, Tex.

Filed April 20, 1970, Ser. No. 29,831

Int. Cl. E02b 17/00, B63b 35/44

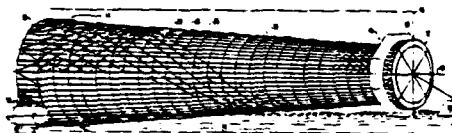
U.S. Cl. 61-46.5

16 Claims

A method and apparatus for transporting an offshore tower to a preselected marine site upon an annular floatation collar encompassingly connected to the upper end of the offshore tower and one or more floatation chambers connected to the outer periphery of the base of the tower. At the preselected site the tower is removed from the base floatation system and pivots about the center of gravity of the offshore tower into a generally vertical posture within the body of water. The annulus is then at least partially ballasted to lower the tower to a position adjacent the bed of the body of water while maintaining the vertical posture of the central axis of the offshore tower with respect to the plane of the surface of the body of water. The tower is then pinned to the bed of the body of water to stably support the tower and retain the vertical orientation thereof with respect to the surface of the body of water, notwithstanding an irregular geography of the bed of the body of water.

Keywords: Offshore construction; Offshore platform, fixed; Seabed foundation

U.S. Cl. X.R. 9-8; 114-0.5F



In one embodiment the floatation system, connected to the base of the outer periphery of the offshore tower, comprises a pair of floatation chambers spaced symmetrically on opposite sides of a plane intersecting the central axis of the offshore tower and lying normally with the plane of the surface of the body of water. In this embodiment one of the floatation chambers is at least partially flooded to induce a rotation of the offshore tower 130° about its center of gravity prior to releasing the floatation chambers from the base of the offshore tower.

3,693,362
PROTECTION OF UNDERWATER EQUIPMENT BY
IMMERSION

Theodore E. Leonard, Houston, Tex., and James R. Lloyd,
Houston, Tex., assignors to Esso Production Research
Company

Filed May 12, 1970, Ser. No. 36,521

Int. Cl. E02b 17/02; B63b 21/38

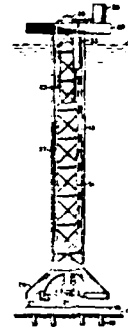
U.S. Cl. 61-46.5

6 Claims

An improvement is disclosed in apparatus of the type including a base anchored to a submerged bottom, an elongated tower provided with a buoyancy chamber near its upper end, and a pivot assembly that connects the tower to the base and permits the tower to sway in response to environmental forces. The improvement resides in a fluid tight, open bottom housing connected to said tower and adapted to enclose the pivot assembly in a bath of a lubricant, regardless of the angle of tower sway.

Keywords: Corrosion prevention; Offshore platform anchor; Offshore platform, floating

U.S. Cl. X.R. 61-63; 114-230



3,693,363
EQUIPMENT FOR MOVING STEP BY STEP A
STRUCTURE CARRYING OUT OPERATIONS
SUPPORTED ON A SEA-BED OR THE LIKE

Henricus Hubertus Van den Kroonenberg, Amsterdam,
Netherlands, assignor to N.V. Industriële, Handelscom-
binatie, Netherlands

Filed March 31, 1971, Ser. No. 129,695

Claims priority, application Netherlands, April 3, 1970,
70/4824

Int. Cl. E02b 17/00; B63b 21/50, 21/56, 15/00

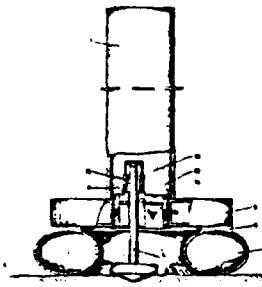
U.S. Cl. 61-46.5

4 Claims

A mobile marine platform can be supported on as few as three legs, with the legs vertically and horizontally adjustable so as to move the platform laterally, by surrounding each leg with an inflatable ring. When the ring is inflated, the ring supports the load while the leg is raised and laterally shifted and then lowered again, after which the ring is deflated and the load shifts back to the leg.

Keywords: Offshore platform, leg; Offshore platform, walking; Seabed foundation

U.S. Cl. X.R. 115-9



3,693,439

ELECTROMAGNETIC WATER CURRENT METER

Vincent J. Cushing, 9804 Hillridge Drive, Kensington, Md.

Filed July 30, 1971, Ser. No. 167,673

Int. Cl. G01f 1/00; G01p 5/08

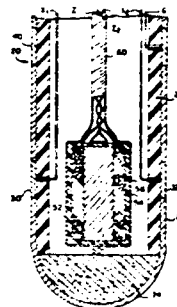
U.S. Cl. 73-194 EM

5 Claims

An electromagnetic water current meter employing a magnet producing an alternating flux field which is of finite intensity and zero slope during a significant portion of each half cycle. The electrodes which receive the water current-generated voltage signal exhibit a sufficiently high resistivity as to assure that the distributed capacitance at the exposed faces of the electrodes does not cumulatively produce an integrating effect which will extend decay of "transformer effect" voltages into the terminal portions of each half cycle during which signal sampling is effected. Carbon which displays a resistivity of about 3,500 microhm-cm at room temperature is a preferred material.

Keywords: Current measurement

U.S. Cl. X.R. 73-181



3,693,440

ELECTROMAGNETIC FLOW METER

Jack R. Olson, San Diego, Calif., assignor to The United States

of America as represented by the Secretary of the Navy

Filed March 21, 1969, Ser. No. 809,361

Int. Cl. G01f 1/00; G01p 5/08

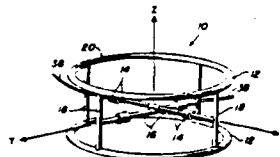
U.S. Cl. 73-194 EM

6 Claims

An electromagnetic flowmeter which has an "open" cage construction of magnet coils and electrodes arranged to achieve an angular response which closely approximates a true cosine, resulting from unrestricted fluid flow through the magnetic field.

Keywords: Current measurement

U.S. Cl. X.R. 73-170A



3,693,572

MARINE FENDER

Stanley R. Crook, 16 Grenelle St., Bridgeport, Conn.

Continuation-in-part of Ser. No. 799,159, Feb. 14, 1969,

abandoned. This application June 22, 1970, Ser. No. 48,294

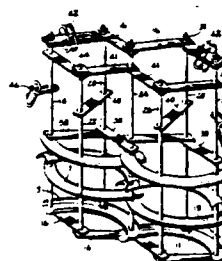
Int. Cl. B63b 21/56

U.S. Cl. 114-219

14 Claims

The invention discloses a marine fender which is of unique scissors-type construction and is made of readily available vehicle tires to provide a rugged flexible fender for boat and pier use and that is easily built to any size.

Keywords: Pier fender



3,693,730
VIBRATORY DEVICE FOR TAKING BOTTOM
SEDIMENTS CORES

Zorab Parnakovich Edigarian; Evgeny Ivanovich Kudinov,
and Vladimir Evgenievich Sukhov, all of Moscow, U.S.S.R.,
assignors to Institut Geologii i razrabotki gorjuchikh rsko-
poemofn, Moscow, U.S.S.R.

Filed July 22, 1970, Ser. No. 57,133

Int. Cl. E21b 7/12

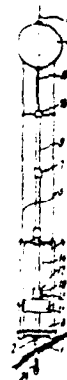
U.S. Cl. 175—6

4 Claims

A vibratory device for taking bottom sediments cores, comprising a string of pipes deepened into the ground by means of a vibrator disposed thereon. In accordance with the present invention it is provided with an arrangement connected with the vibrator and providing for periodical engagement and disengagement of the vibrator with the string of pipes, and a hoist providing for periodical displacement of the vibrator which is originally disposed on the lower portion of the string of pipes up the latter as it is being deepened, and operatively coupled with the engaging arrangement.

Keywords: Instrument deployment; Sampler, seabed-driven core

U.S. Cl. X.R. 173-19; 173-149



3,694,324
METHOD OF MEASURING ACCELERATED
CORROSION RATE

Robert G. Seyl, 1123 Mulford St.,
Evanston, Ill. 60202

Filed Jan. 16, 1969, Ser. No. 791,653

Int. Cl. G01n 27/46

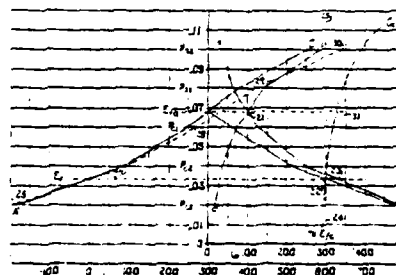
U.S. Cl. 204—1 T

8 Claims

A method for measuring accelerated corrosion rate. The method uses a first measurement of current according to the principle of proportionality of measured current to naturally occurring current and uses the application of a small increment of voltage applied to one or more electrodes as in U.S. Pats. 3,156,631; 3,069,332 and 3,250,689. After measurement of a first current in accordance with the known method, an increment of cathodic polarizing current is applied to the electrode or electrodes. This increment of cathodic polarizing current is varied over a range. The rate determining corrosion current is then determined by the relationship between the first measured current and the minimum current measured in said range.

Keywords: Corrosion measurement

U.S. Cl. X.R. 204-195C



OCTOBER 3, 1972

3,695,042

SURFACE OIL CONTAINMENT DEVICE

Cleo S. Denison, P.O. Box 5, Lynn, Ark.

Filed July 7, 1970, Ser. No. 52,899

Int. Cl. E02b 3/00, 11/04

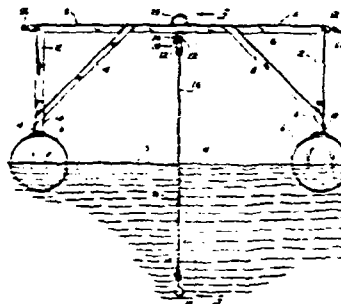
U.S. Cl. 61-1 F

3 Claims

A device for containing oil spills in the open sea, comprising a plurality of hanger float structures having a continuous flexible wall or barrier suspended therefrom that encircles and contains an oil spill, the bottom edge of the wall being weighted and submerged, and the hanger float structures being connected with and held in place by spaced anchor float structures to which anchors are attached.

Keywords: Pollutant, surface barrier

U.S. Cl. X.R. 114-.5T



3,695,046

FENDERS

Ralph P. Torr, New Malden, and Juncker Zelo Nicolaisen, Crawley, both of England, assignors to Andre Rubber Company Limited, Kingston-Bj-Pass Surbiton, Surrey, England

Filed Jan. 23, 1970, Ser. No. 5,430

Claims priority, application Great Britain, Jan. 23, 1969, 3,862/69

Int. Cl. E02b 3/22

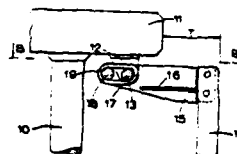
U.S. Cl. 61-46

8 Claims

A fender arrangement for a jetty, dockside, dolphin or the like comprising a fender mounted for load-absorbing movement towards the edge of the jetty against the action of normally unstrained elastomeric tension springs in the form of endless bands looped between mounting pedestals carried by the jetty and the fender. The fender may be slender driven piling or bodily carried and guided by the jetty. Tension springs of elastomeric material show specified advantages over compression and shear springs in jetty fenders.

Keywords: Pier fender

U.S. Cl. X.R. 61-48



3,695,047

UNDERWATER LIQUID STORAGE FACILITY

Ivo C. Pogonowski, and Paul D. Carmichael, both of Houston, Tex., assignors to Texaco Inc., New York, N.Y.

Filed July 2, 1970, Ser. No. 51,792

Int. Cl. E02b 17/00; B65d 89/10

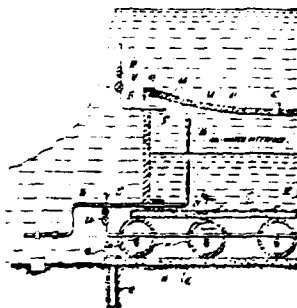
U.S. Cl. 61-46.5

6 Claims

The invention relates to a deep water storage facility formed primarily of concrete, for holding a liquid such as crude oil having a lesser density than that of the surrounding water. The facility includes a floatable base which is supportably fastened to a storage tank. The latter includes a support foundation having an upstanding continuous side wall defining an enclosure. A canopy fastened to the upper rim of said foundation wall thereby defines a substantially closed storage compartment. Said canopy is formed of reinforced concrete and assumes an inwardly contoured or concave shape whereby to withstand compressive stresses induced by the buoying action of stored crude oil.

Keywords: Offshore storage tank, submerged; Seabed foundation

U.S. Cl. X.R. 114-.5T



3,695,049

METHOD AND APPARATUS FOR BURYING A PIPELINE HAVING FIXED FLUIDIZATION MEANS

Johannes Van Steveninck, Rijswijk, Netherlands, assignor to Shell Oil Company, New York, N.Y.

Filed Jan. 11, 1971, Ser. No. 105,201

Claims priority, application Great Britain, Feb. 11, 1970, 6,559/70

Int. Cl. F16l 1/00; E02f 5/02

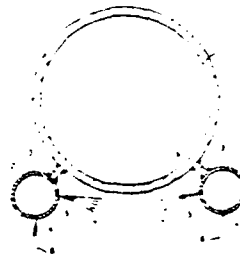
U.S. Cl. 61-72.4

10 Claims

A pipeline having fluidization pipes provided with fluidization nozzles running along the pipeline and secured thereto. To bury the pipeline in the unconsolidated bottom of a body of water such as the seabed, the pipeline is laid on the seabed and water is pumped into the fluidization pipes; the water leaves the fluidization nozzles and fluidizes the seabed along the pipeline causing the pipeline together with the fluidization pipes to sink into the fluidized seabed.

Keywords: Seabed pipeline placement; Seabed trencher

U.S. Cl. X.R. 37-63



3,695,103

CURRENT AND TURBULENCE METER

Franklyn C. W. Olson, Panama City, Fla., assignor to The United States of America as represented by the Secretary of the Navy

Filed Sept. 23, 1970, Ser. No. 74,782

Int. Cl. G01p 13/00; G01w 1/00

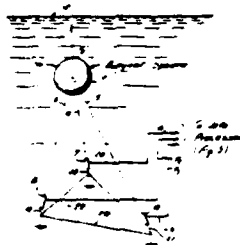
U.S. Cl. 73-170 A

9 Claims

The invention disclosed is an instrument for sensing, measuring, and indicating the velocity components in, the resultant velocity and direction of flow of, and turbulence occurring within a moving fluid medium. It incorporates a fluid movement responsive spherical sensor tethered by a trio of taught wires containing strain gages, one or more computers (depending on the parameters being calculated), and a readout calibrated in terms of the information desired during given operational circumstances.

Keywords: Current measurement

U.S. Cl. X.R. 73-189



3,695,207

ANCHORAGE FOR A BOAT DOCK, BUOY OR THE LIKE

Gerald D. Atlas, 2940 West Balmoral, Chicago, Ill.

Filed Aug. 17, 1970. Ser. No. 64,280

Int. Cl. B63g 21/24

U.S. Cl. 114—206 R

2 Claims

An anchorage for a boat dock, buoy, or the like, in which a suspended non-buoyant weight is cable-supported at a predetermined point between a fixed anchor on the floor of the harbor and the dock or buoy, for allowing the rise or fall of the dock, buoy or the like with the tide or to compensate for wave undulation, with the minimum degree of lateral movement and without disturbance to the imbedded anchor.

Keywords: Buoy mooring system; Pier, floating; Small-craft pier

U.S. Cl. X.R. 114-230



3,695,209

VESSEL MOORING DEVICES

Elroy J. Giese, Cleveland, Ohio, assignor to Tomlinson Industries, Inc.

Filed Aug. 21, 1970, Ser. No. 65,850

Int. Cl. B63b 21/04, 21/00

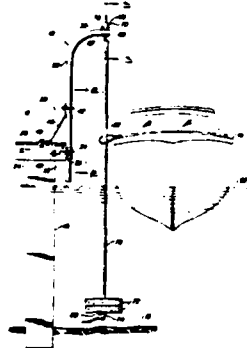
U.S. Cl. 114—230

10 Claims

The specification and drawings disclose devices for mooring boats. The devices are arranged to permit vertical movement of the boats, such as caused by rise and fall of tides or rolling of the boats while maintaining the boats away from an associated dock, pier, seawall, float or the like and redistributing or absorbing energy produced by the action of water, wind and other normally expected conditions. The devices disclosed all include a mounting assembly having a support arm adapted to extend outwardly above the normal maximum water levels. A mooring member extends vertically downward from the support arm to a predetermined position which, depending upon the application, may be either below or somewhat above the normal minimum water level. The member is supported only at its upper end and is not otherwise guided or constrained. Four specific embodiments are disclosed. Two comprise weighted cables and two other comprise resilient plastic pipes or tubes.

Keywords: Small-craft mooring device

U.S. Cl. X.R. 61-48



3,695,441
**SELF-PROPELLED FLOATING DOCK AND SEPARATOR
FILTER ASSEMBLY FOR TREATING POLLUTED
WATER SURFACES AND NAUTICAL WORKS**

Lucien Chastan-Bagnis, 21, Avenue Isola Bella, Cannes,
France

Filed Aug. 10, 1970, Ser. No. 62,568

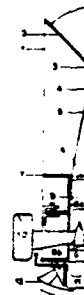
Int. Cl. C02b 9/02

U.S. CL 210-242

3 Claims

There is provided a self-propelled enclosure for treating polluted water surfaces. It comprises two longitudinal caissons, a bottom floor and transverse partitions to connect the longitudinal caissons and to define the enclosure. A door is pivotally mounted at the front end of the floating enclosure and is downwardly foldable between a closed position of the enclosure, intermediate positions of the door and a fully opened position thereof in a plane which substantially coincides with the plane of the bottom floor. In this manner, the upper edge of the door can lie at a predetermined depth under the water surfaces to enable polluted water to enter the enclosure. A vault is formed in the bottom floor to define a channel underneath the bottom floor and a motor-operated helix is disposed at the rear end of the channel to suck water in the channel so that upon downwardly folding the door at a level lying immediately beneath a polluting layer, the self-propelled enclosure will be seen to advance over water to cause the polluting layer to slowly enter the enclosure until it fills the same.

Keywords: Pollutant removal watercraft



3,696,326
DEPTH SOUNDER DIGITIZER
Silvan E. McAlpin, Dallas, Tex., assignor to Mobil Oil Corporation

Filed May 21, 1970, Ser. No. 39,494

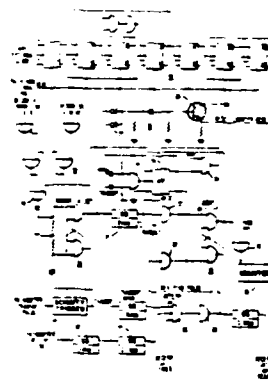
Int. Cl. G01s 9/68

U.S. CL 340-3 R

5 Claims

A water depth digitizer produces a digital readout from a depth sounder of the type which produces an acoustic ranging pulse and which includes a transducer producing a receive signal representing the return of a reflected acoustic ranging pulse. A digital counter is started in response to an acoustic ranging pulse and is stopped in response to the receive signal occurring after the selected ranging pulse. In order to prevent erroneous readings which occur because the reflected acoustic ranging pulse is not of sufficient amplitude to be detected, a circuit is provided to detect valid information. The digital counter is reset when a receive signal is not received before the next occurring acoustic ranging pulse.

Keywords: Sonar, depth sounder



3,696,329

MARINE STREAMER CABLE

Gerald D. Hazelhurst, Houston, Tex., assignor to Mark Products, Inc., Houston, Tex.

Filed Nov. 12, 1970, Ser. No. 88,616

Int. Cl. H01b 7/12

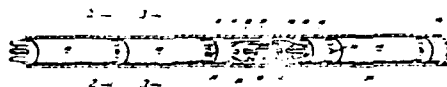
U.S. Cl. 340-7 R

4 Claims

A streamer cable is disclosed that has a plurality of float members inside its outer sheath to add buoyancy and allow the diameter of the cable to be kept to a minimum. The sensors or hydrophones carried by the cable are connected acoustically to the water by a filler having good acoustic properties. The filler is either an elastomeric material cured in place or a high temperature-low viscosity, low temperature-high viscosity, grease-like material. A method of locating the float members for uniform buoyancy is also disclosed.

Keywords: Seismic streamer cable

U.S. Cl. X.R. 174-101.5



OCTOBER 10, 1972

3,696,623

WOVEN MAT

Olaf Heine, Kelkheim/Taunus, and Gerhard Knisse, Wohltorf, both of Germany, assignors to Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning, Frankfurt am Main, Germany

Continuation-in-part of Ser. No. 843,518, July 22, 1969, abandoned. This application June 29, 1971, Ser. No. 158,036

Claims priority, application Germany, July 30, 1968, P 17 84 360.6

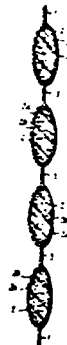
Int. Cl. E02b 3/12

U.S. Cl. 61-38

11 Claims

An assembly for preventing erosion of sand and pebbles from shores, beaches, waterways and the like. The assembly includes an outer mat made from a thermoplastic material. The mat has an open net weave and includes several compartments which are adjacent one another. A plurality of open net weave bags, also made of thermoplastic material, and filled with entangled ribbons of thermoplastic material are inserted into the compartments of the mat. The assembled mat may be attached to the shore.

Keywords: Fabric mat; Slope protection; Wave absorber beach



3,696,624

BUCKET WHEEL ICE CUTTER

John D. Bennett, Denton, Tex., assignor to Sun Oil Company (Delaware), Dallas, Tex.

Filed Oct. 2, 1970, Ser. No. 77,508

Int. Cl. E02b 17/00; B63b 35/12

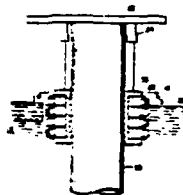
U.S. Cl. 61-46

5 Claims

Bucket wheels are mounted on offshore platforms or ship prows for cutting ice sheets found in frigid waters. The bucket wheels rotate in a generally horizontal plane and are paired in opposite directions so that a torque is not placed on the structure or ship. Multiple sets of bucket wheels can be used to cut a thick section of ice and/or the bucket wheels can be inclined or arranged to oscillate up and down to cut a larger vertical section.

Keywords: Ice protection; Offshore structure fender

U.S. Cl. X.R. 61-1; 114-42; 299-24



3,697,756

DEVICE FOR INSERTING TAGGED SAND INTO OCEAN FLOOR

Ellick H. Acree, Lenoir City; Hugh R. Brashear, Jr., Concord, and Forrest N. Case, Oak Ridge, all of Tenn., assignors to The United States of America as represented by the United States Atomic Energy Commission

Filed July 7, 1971, Ser. No. 160,390

Int. Cl. G01h 5/02

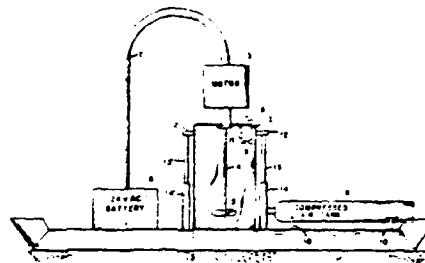
U.S. Cl. 250-106 T

4 Claims

A device is provided for introducing an identifiable radioisotope tag into the ocean bottom in such a manner that a radiation material balance can be observed as the sand transport process occurs. The device comprises a cylinder having a motor-operated stirrer for admixing sand and a quantity of isotope tagged sand, the cylinder being mounted on a sled in such a manner that it can be depressed vertically by means of a hydraulic ram into the ocean bottom.

Keywords: Instrument deployment;
Instrument, radioisotope;
Sedimentation measurement

U.S. Cl. X.R. 250-83.6S



3,697,764

METHOD AND APPARATUS FOR GENERATING ELECTRICITY

Ralph T. Stanziola, and George A. Shuster, both of Philadelphia, Pa., assignors to S & S Research & Development Corp., Levittown, Pa.

Filed March 29, 1971, Ser. No. 128,668

Int. Cl. F03b 13/12

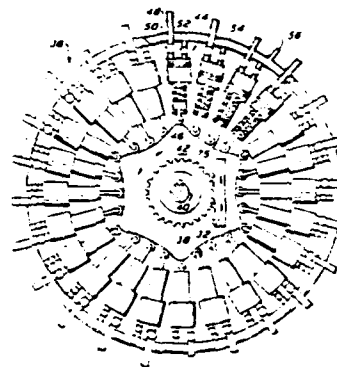
U.S. Cl. 290-42

16 Claims

Motion of waves is converted into energy in the form of compressed air which is stored in large containers. Compressed air flowing from the containers is utilized to drive turbine-generators to generate electricity. The turbine-generators are selectively driven by stored energy which may be controlled. Generation of electricity may be varied to meet the demand regardless of the tides or the state of the waves.

Keywords: Electrical generator; Power, wave

U.S. Cl. X.R. 290-53; 417-333



OCTOBER 17, 1972

3,698,198

DEEP-WATER DRILLING, PRODUCTION AND STORAGE SYSTEM

Rex V. Phelps, Tulsa, Okla., assignor to Warren Petroleum Corporation, Tulsa, Okla.

Filed Feb. 12, 1971, Ser. No. 114,810

Int. Cl. E02b 17/00

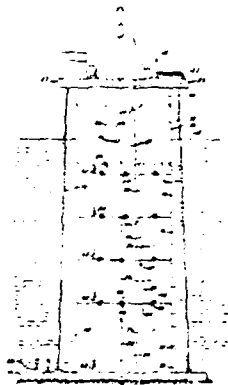
U.S. Cl. 61—46.5

8 Claims

Keywords: Offshore construction; Offshore platform, fixed; Offshore storage tank, emergent; Seabed foundation

U.S. Cl. X.R. 175.9

An offshore platform for drilling wells and producing oil from wells comprising a plurality of stacked annular concrete modules having concentric inner and outer walls enclosing a central opening that extends downwardly from the deck to the marine floor and a buoyancy chamber surrounding the central opening. The ends of the buoyancy chamber are closed to allow the modules to be floated to the well site. Means are provided to supply compressed air into the buoyancy chambers to control the amount of water in the buoyancy chambers to control the negative buoyancy of the platform and the load placed on the marine floor by the platform. The deck of the platform slopes downwardly from a curbing around its periphery to the central opening. Means are provided to lock the modules together into a unitary structure.



3,698,573

METHOD AND APPARATUS FOR LOADING A DREDGING VESSEL WITH DREDGING SPOIL

Tjako Aaldrik Wolters, Vianen, and Romke van der Veen, Heselaa, both of Netherlands, assignors to Ballast-Nedam Groep N.V., Amsterdam, Netherlands

Filed May 14, 1971, Ser. No. 143,440

Claims priority, application Netherlands, May 14, 1970, 70.06965

Int. Cl. B65g 27/00

U.S. Cl. 214—15 B

4 Claims

Keywords: Dredge-spoil measurement

U.S. Cl. X.R. 114-26; 214-152

For loading a dredging vessel upto its maximum conveying capacity the weight of the load is measured, wherein a distinction is made between the dredging spoil being in settled and the dredging spoil being in fluidized condition.

The magnitude decisive of the stability of the dredging vessel with its load is calculated.

The calculated value is compared with the inadmissible value of the magnitude for determining the end of the loading process.



3,698,850

PROMOTION OF BURNING OF OIL SLICKS WITH PARTICULATE, FOAMED ALKALI METAL SILICATES
Derry D. Sparlin, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.

Continuation-in-part of Ser. No. 132,547, April 8, 1971, abandoned. This application March 8, 1972, Ser. No. 232,923
Int. Cl. E02b 15/04

U.S. Cl. 431-8

4 Claims

Particles of foamed water soluble and dispersible alkali metal silicates are distributed over oil slicks to absorb the oil. The oil is then burned after which the water soluble and dispersible particulate foamed alkali metal silicate particles solubilize and disperse.

Keywords: Pollutant burning; Pollutant absorption; Pollutant dispersion

U.S. Cl. X.R. 210-40; 210-DIG.21

No Figure

3,699,237

BUOYANT ELECTRIC CABLE

Thomas J. Melia, Sutton, Mass., assignor to United States Steel Corporation

Filed Feb. 10, 1971, Ser. No. 114,274
Int. Cl. H01b 7/12

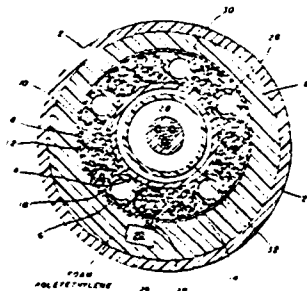
U.S. Cl. 174-101.5

12 Claims

A buoyant electric cable has a core member such as a pipe for supporting a plurality of elements which are stranded around the core member. Some of said elements are electric conductors and the other elements are tubes which are adapted to receive a fluid for changing the buoyancy of the cable. An eccentric foamed jacket surrounds the stranded elements with a sensing element embedded in the thickest part of the jacket. A protective jacket is preferably provided over the outside of the foamed jacket.

Keywords: Instrument cable; Seismic streamer cable

U.S. Cl. X.R. 174-111R; 174-110F; 174-113R; 174-115; 340-13R



OCTOBER 24, 1972

3,699,686

BOTTOM AND BANK FACING MATTRESS

Jan Gerrit De Winter, Enschede, Netherlands, assignor to Nicolson N.V., Enschede, Netherlands

Filed Nov. 5, 1969, Ser. No. 874,318

Claims priority, application Netherlands, Nov. 12, 1968, 6816093

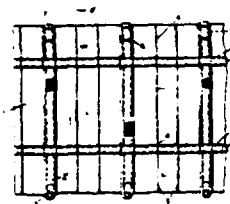
Int. Cl. E02b 3/12

U.S. Cl. 61-38

9 Claims

A mattress for use in building bottom and bank revetments consists of a woven mat of plastics material to which tubular structures of plastics material are secured as substitutes for conventional fascines, said tubular structures being adapted to be filled with ballast material.

Keywords: Fabric mat; Seabed scour protection; Slope protection



3,699,688
**APPARATUS AND METHOD FOR REMOVING AND/OR
 ADDING COLUMN SECTIONS TO A COLUMN OF A
 MARINE STRUCTURE**

John C. Estes, Beaumont, Tex., assignor to Bethlehem Steel Corporation

Filed Nov. 25, 1970, Ser. No. 93,301

Int. Cl. E02b 17/00; B23p 19/00

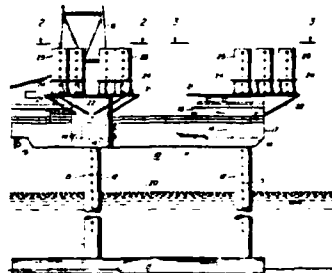
U.S. Cl. 61—46.5

15 Claims

A method and apparatus for removing and/or adding column sections to a column of a marine structure, such as a mobile drilling platform, employs a carriage for supporting a column section slidably mounted on the marine structure platform and jacking means for moving the platform and column relative to each other. When a column section is to be added to the column, the carriage with a column section supported thereon is positioned above the column. The jacking means is then operated to bring the top of the column into contact with the bottom of the carriage supported column section. The column section is then welded to the column and detached from the carriage. When a column section is to be removed from the column, a carriage is positioned above the column. The jacking means is then operated to bring the column within the carriage, and the column is secured to the carriage. A portion of the column is then severed from the column.

Keywords: Offshore platform, jack up;
 Offshore platform, leg

U.S. Cl. X.R. 29-429; 61-53.5; 175-9;
 214-1; 214-6



3,700,046
**TWO-STAGE DROP HAMMER FOR DRIVING LARGE
 DIAMETER PILING**

Robert G. Evans, P.O. Drawer 68, Harvey, La.

Filed March 8, 1971, Ser. No. 121,663

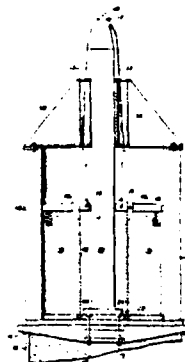
Int. Cl. E02d 7/00

U.S. Cl. 173—103

6 Claims

A two-stage or multi-stage drop hammer for driving large diameter piling having a backing plate welded onto the upper terminal end of a cylinder to be driven to form a pile, a hammer guide secured onto the backing plate, said hammer guide containing an annular, contoured first hammer for impacting upon a large peripheral portion of the bottom member of the hammer guide, and a second hammer for impacting upon a large central area of the bottom member of the hammer guide, and a flanged extension on the second hammer for lifting the first hammer to a distance above the bottom member of the hammer guide, whereupon dropping of the hammers provides and allows the first hammer to impact upon the bottom member of the hammer guide in timed sequence ahead of the second hammer impacting upon the bottom member of the hammer guide.

Keywords: Offshore construction; Pile
 driver, impact



3,700,107
**APPARATUS FOR RECOVERY OF FLOATING
 SUBSTANCES**

Edmond Flaviani, 719 28th Avenue, San Francisco, Calif.
 Filed Nov. 18, 1970, Ser. No. 90,544
 Int. Cl. C02b 9/02; E02b 15/04

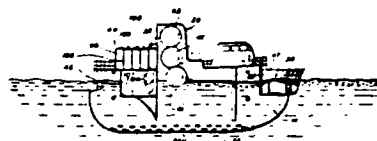
U.S. Cl. 210-242

11 Claims

The disclosure relates to a propelled hull having an open front as well as an open rear, a scoop removably mounted on the hull at its open front for picking up from the surface of water mixtures of water and pollution material floating thereon, together with an upright partition fixedly secured in said hull, a housing supported on said partition, a plurality of rotatable cylinders mounted in vertically arranged engagement to one another within said housing, said cylinders having spirally arranged grooves in the peripheries thereof for transferring picked up liquid material from one cylinder to another, a separator on said hull in communication with the uppermost cylinder for receiving mixtures of liquids from said uppermost cylinder and for separating one liquid from another for discharge into separate areas, means for rotating said cylinders, and means at the rear of said hull for discharging separated liquids from said separate areas of said hull to a remote location.

Keywords: Pollutant collection; Pollutant, mechanical removal; Pollutant removal watercraft

U.S. Cl. X.R. 210-DIG.21



3,700,108
OIL SKIMMER
 Frank A. Richards, 11 Martha Drive, Bowmansville, N.Y.
 Filed Feb. 4, 1971, Ser. No. 112,598
 Int. Cl. C02b 9/02

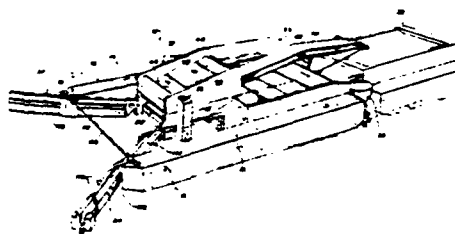
U.S. Cl. 210-242

6 Claims

A float supported unit for removing oil films, debris or other floating liquid and/or solid impurities from the surface of a body of water including an impurity-water conveyor, a perforated, separator-conveyor for separating solid impurity components from the conveyed impurities and water, and a holding tank for thereafter gravity separating water from the liquid impurity components. The impurity-water conveyor is pivotally supported at its upper-outlet end adjacent a fore-aft mid-point of the float support and has its lower-intake end independently float-supported to rise and fall in conformity with the surface of the water adjacent the fore end of the float support. The impurity-water conveyor includes a plurality of relatively flexible paddle elements, which cooperate to elevate separate charges of impurities-water upwardly along a channel guide; each charge being formed and subsequently conveyed and separated with a minimum of emulsion inducing agitation, whereby to promote relatively rapid separation of the liquid impurity components from the water in the holding tank.

Keywords: Pollutant collection; Pollutant debris; Pollutant, mechanical removal; Pollutant removal watercraft

U.S. Cl. X.R. 210-DIG.21

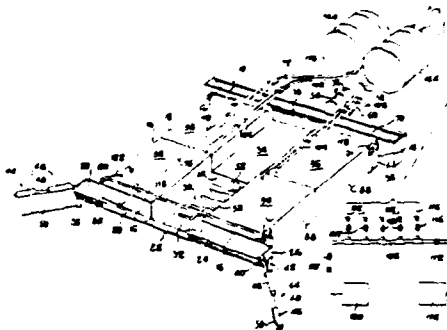


3,700,109
**APPARATUS FOR REMOVING FLOATING LIQUIDS
 FROM THE SURFACE OF A BODY OF WATER**
 Charles J. Lasko, 4344 Washington Road, Parlin, N.J.
 Filed Dec. 23, 1970, Ser. No. 101,016
 Int. Cl. C02b 9/02, E02b 15/04
 U.S. Cl. 210—242 9 Claims

Apparatus for skimming liquids, such as oil, having a specific gravity less than that of water from the surface of a body of water including a pair of laterally spaced hulls supporting a basin between them and a skimming edge immediately ahead of the basin, the hulls including fore and aft chambers and means for admitting or expelling water independently into or out of each chamber to select the level and the fore and aft tilt of the hulls relative to the surface of the body of water so as to enable skimmed liquid to pass over the skimming edge and into the basin.

Keywords: Pollutant dispersion; Pollutant removal watercraft; Pollutant, suction removal

U.S. Cl. X.R. 210-DIG.21



3,700,593
**APPARATUS AND METHOD FOR REMOVING OIL
 PRODUCTS FLOATING ON WATER**
 Cornelis Bezemer, Harco J. Tadema, and Jacob J. H. C. Houbolt, Rijswijk, Netherlands, assignors to Shell Oil Company, New York, N.Y.
 Continuation of abandoned application Ser. No. 753,695, Aug. 19, 1968. This application Dec. 21, 1970, Ser. No. 100,376
 Claims priority application Great Britain, Sept. 18, 1967, 42,331/67
 Int. Cl. B01d 15/00
 U.S. Cl. 210—40 22 Claims

An apparatus and method for removing oil slicks from a water surface wherein an elongated absorbent porous body is positioned along the water surface by base means which include squeezers for removing oil from the body, a container for collecting the oil and drive means for moving the body past the squeezers.

Keywords: Pollutant absorption; Pollutant, mechanical removal

U.S. Cl. X.R. 210-DIG.21; 210-DIG 242



3,700,602
**METHOD FOR MASS TAGGING SAND WITH A
 RADIOACTIVE ISOTOPE**
 Elick H. Acres and Forrest Neil Case, Oak Ridge, Tenn., and Nancy H. Stephens, Laurinburg, N.C., assignors to the United States of America as represented by the United States Atomic Energy Commission
 No Drawing. Filed Sept. 4, 1969, Ser. No. 855,390
 Int. Cl. G21b 5/02
 U.S. Cl. 252—301.1 R 3 Claims

A procedure for tagging sand with ¹⁹⁸Au for use in the study of sediment transport involves precipitation of ¹⁹⁸Au directly onto the sand particles from an appropriate aqueous solution containing the radioisotope by means of a reaction with immiscible organic reducing agent such as p-isopropylbenzaldehyde. This process provides a radioisotope labeling technique in which the number of radiations detected per unit weight of sand is approximately proportional to the mass rather than being proportional to the surface area.

Keywords: Instrument, radioisotope; Sedimentation measurement

U.S. Cl. X.R. 250-106T

No Figure

DEMAND SONO BLOY

Richard J. Haase, and William L. Roever, both of Houston,
Tex., assignors to Shell Oil Company, New York, N.Y.
Filed June 18, 1970. Ser. No. 47,468
Int. Cl. G01s 9/66

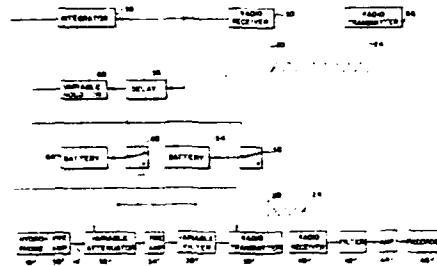
U.S. Cl. 340-2

2 Claims

A demand sonobuoy having both sending and receiving radio equipment therein. The transmission of seismic data detected by a hydrophone connected to the demand sonobuoy is controlled by radio signal from a remote point.

Keywords: Buoy, instrumented; Seismic hydrophone

U.S. CI. X.R. 340-7R



OCTOBER 31, 1972

3,701,258

BUOYANT PULLEY LOCATING AND ANCHORING DEVICE FOR AN OIL MOP

Herbert M. Rhodes, New Orleans, La., assignor to Oil Map
Inc., Metairie, La.
Filed Feb. 16, 1971, Ser. No. 115,328
Int. Cl. E02b 15/04

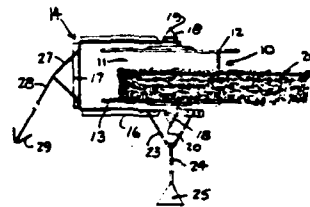
U.S. CL 61-1 F

3 Claims

The present disclosure is directed to a buoyant pulley for use with an oil mop for positioning the pulley and locating same to maintain the pulley in substantially the desired height in the water and at substantially a horizontal attitude against the pull of the endless oil mop passing about the pulley.

Keywords: Pollutant absorption; Pollutant, mechanical removal

U.S. Cl. X.R. 210-DIG.21; 210-242; 254-195



3,701,259

OIL POLLUTION BARRIER

Olaf Heartness, 41 Van Reyden St., Jersey City, N.J.

Filed Aug. 13, 1971, Ser. No. 171,693

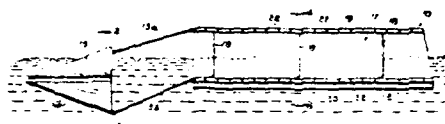
Int. Cl. E02b 15/04

U.S. Cl. 61-1 F

9 Claims

The method of laying and the construction of an oil pollution barrier for use on the ocean or other bodies of water. The method comprises the simultaneous and synchronized unreeling from a vessel of a resilient barrier strip formed with spaced inflatable pockets and a sectioned resilient hose containing a liquid chemical. Each inflatable pocket has an opening formed at the base which is in communication with an injection tube which is removably mounted below each pocket in the lower edge of the barrier strip. Each injection tube contains a chemical powder, reactive with the liquid in the hose to form a gas. At a predetermined point the injection tube is forced into the hose, the hose is compressed to force the liquid upward into contact with the chemical powder, the gas formed by the reaction inflating the pocket in the plastic barrier. In alternative forms of the invention the pocket is inflated by the use of a low boiling point volatile liquid or compressed gas stored in the hose. The barrier strip and hose are unreeled until the oil slick is surrounded, whereafter the ends of the barrier and hose are cut to form an enclosure around the oil spill.

Keywords: Pollutant, surface barrier



3,701,387

CORE SAMPLING APPARATUS

Nicholas L. Koot, Lafayette, La., assignor to Global Marine Inc., Los Angeles, Calif.

Filed Nov. 4, 1970, Ser. No. 86,650

Int. Cl. F21b 7/12

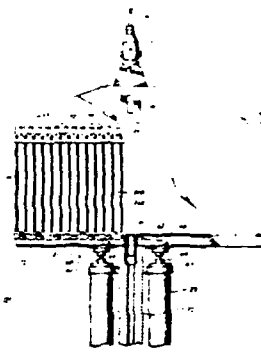
U.S. Cl. 175-6

15 Claims

Apparatus for taking a plurality of sequential punch core samples in underwater sediments is provided. Core sampling tubes are driven into the sediments by hydraulic pressure acting through a central guide tube. The core sampling tube is withdrawn by hydraulic pressure applied through an annular space between the guide tube and a surrounding pipe. The hydraulic pressures are applied by a pair of hydraulic pumps using sea water as the fluid. A plurality of core sampling tubes are contained in a magazine and are fed to the guide tube one at a time for taking samples. The filled core tubes are returned to the magazine where they are retained and stored. First and second sets of drive cams on the magazine are operated alternately by reverse operation of the hydraulic pumps so that the containers in the magazine controllably advance only one container width at a time.

Keywords: Instrument deployment; Instrument retrieval; Sampler, power supply; Sampler, seabed-driven core

U.S. Cl. X.R. 175-20; 175-52; 175-60; 175-247



3,701,429
**SKIMMER FOR REMOVING FLOATING MATTER FROM
 A BODY OF LIQUID**

Orville Carroll Scheil, Rogers, Ark., assignor to Hoyt Corporation, Rogers, Ark.

Filed Oct. 9, 1970, Ser. No. 79,607

Int. Cl. C02b 9/02

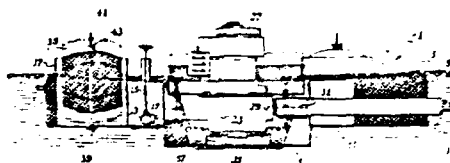
U.S. Cl. 210-242

7 Claims

A skimmer for removing floating matter from a body of liquid, such as skimming oil spills from water, comprises a floating annular body having gently downwardly centrally inclined upper surfaces that terminate radially inwardly adjacent an annular weir. Oil is drawn over the inclined surfaces and flows over the weir and collects in a central sump. The weir is raised by an annular float disposed in the sump when the overflow in the sump is too great to be removed by a centrally positioned pump. A ballast chamber makes possible a rough adjustment of the draft of the skimmer. Peripherally spaced marginal floats disposed in upright casings that extend above and below the water line are vertically adjustable to trim the floating skimmer and to make possible a fine adjustment of the draft.

Keywords: Pollutant, suction removal; Pump

U.S. Cl. X.R. 210-DIG.21



3,701,430
OIL SKIMMER

Ralph L. Tuttle, 7135 Hollywood Boulevard, Hollywood, Calif.

Filed Feb. 16, 1971, Ser. No. 115,416

Int. Cl. C02b 9/02

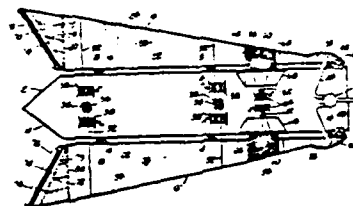
U.S. Cl. 210-242

7 Claims

A structure to be used in conjunction with a barge for skimming oil spilled on the surface of harbor waters, lakes and the like comprising one or two outriggers which can be partially positioned just below the surface of the oil and which have harvesting booms that converge at the rear joining a collector sump from which the oil and water can be pumped into the barge. The system may also include a means for separating the oil from the water and also for separating out large particles of debris which are frequently found floating in these waters. For use in situations where the body of water has a light-swell condition, the outriggers include flexible leading ends which will follow the contour of the water surface.

Keywords: Pollutant collection; Pollutant debris; Pollutant removal watercraft; Pollutant, suction removal

U.S. Cl. X.R. 210-DIG.21



NOVEMBER 7, 1972

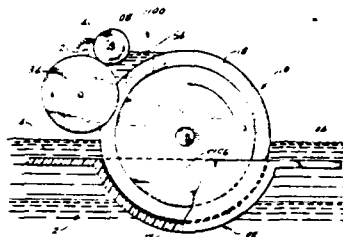
3,702,297
OIL SKIMMING DEVICE AND METHOD
John Maksim, Jr., 8165 Cornwall Ave.,
Etiwanda, Calif. 91739
Continuation-in-part of application Ser. No. 338,600,
July 2, 1969. This application Feb. 16, 1970,
Ser. No. 11,401

Keywords: Pollutant absorption; Pollutant,
mechanical removal

U.S. Cl. X.R. 210-DIG.21; 210-242

Int. Cl. B01d 15/00
U.S. Cl. 210-40 11 Claims

A method and apparatus for removing crude oil from a body of water includes a sponge-coated collection roll. The ends of the collection roll are supported from floats so that the lower portion of the roll is immersed in the oil, and a drive mechanism rotates the collection roll to continuously absorb the oil. A downward sloping wringer is held tightly against the lateral surface of the collection roll to deform the collection roll surface and squeeze the oil from the roll. A doctor blade or a roller disposed against the longitudinal surface of the wringer provides an inclined weir for the oil squeezed from the collection roll. The oil flows downwardly into a collection tank located adjacent to the collection roll. An elongated baffle plate below the collection roll limits the amount of water taken up by the collection roll. A worm gear removes grease accumulations trapped by the doctor blade or roller.



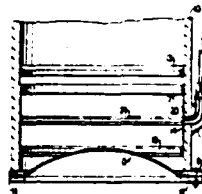
NOVEMBER 14, 1972

3,702,537
GROUTING SEAL FOR PILING
Don B. Landers, Arlington, Tex., assignor to Oil States Rubber
Company
Filed Oct. 14, 1970, Ser. No. 80,564
Int. Cl. E02d 5/14, 5/32; F16j 15/32
U.S. Cl. 61-46.5 7 Claims

Keywords: Grouting; Offshore platform,
leg; Pile, structure connection

U.S. Cl. X.R. 61-54; 277-34; 277-128

A seal for sealing the annular space between the outer surface of a pile and the inner surface of a hollow member such as a marine platform leg or skirt guide through which the pile is driven, the seal comprising an elastomeric body normally lying against the inner surface of the hollow member and peripherally attached thereto, and a cable encompassing the body such that when the cable is drawn tightly around the body in a central zone between its ends, the body is cinched or drawn into tight engagement with the pile to seal the annulus between it and the hollow member, for instance, while grout is being poured into the annulus and setting.



3,702,540

APPARATUS AND METHOD FOR BURYING PIPELINE
Johannes Van Steveninck, Rijswijk, Netherlands, assignor to
Shell Oil Company, New York, N.Y.
Filed Oct. 30, 1970, Ser. No. 85,521
Int. Cl. F16L 1/00, E02F 5/02

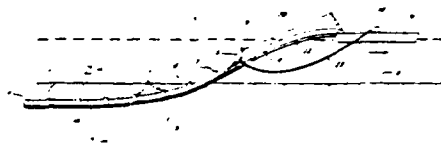
U.S. Cl. 61-72.4

3 Claims

An apparatus for burying a pipeline in the sea bed by fluidizing the bottom material so that the pipeline sinks into the sea bed under its own weight comprises a number of pipes provided with fluidization nozzles along their length for injecting fluid into the sea bed. The pipes are slidably mounted on the underside of the pipeline and pulled along the pipeline as it is laid from a barge.

Keywords: Seabed pipeline placement;
Seabed trencher

U.S. Cl. X.R. 37-63; 37-78



3,702,657

POLLUTION CONTAINMENT BARRIER
Gerald Robert Cunningham, Santa Monica, Calif., and
Lemuel Dale Woody, Jr., Houston, Tex., assignors to
Esso Production Research Company
Filed Feb. 11, 1971, Ser. No. 114,553
Int. Cl. E02b 15/04

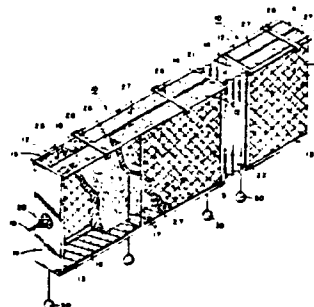
U.S. Cl. 210-242

3 Claims

A flow-through pollution containment barrier for the control and removal of potential oil spill hazards in a water environment includes a series of cages linked together. Oil sorbent buoyant material, capable of allowing water to pass freely through it while remaining oil wet when contacted by an oil water mixture is removably arranged in each cage. Liquid impervious material is arranged in the spaces at the joints between the cages to prevent passage of liquid therethrough. Each cage is weighted in order to maintain a predetermined submergence of the cage in a body of water.

Keywords: Pollutant absorption; Pollutant,
surface barrier

U.S. Cl. X.R. 61-1F; 210-DIG.21



3,702,778

**SHIP'S HULL COATED WITH ANTIFOULING
SILICONE RUBBER**
William J. Mueller, Worthington, and Louis J. Nowacki,
Columbus, Ohio, assignors to Batelle Memorial Insti-
tute, Columbus, Ohio
No Drawing, Filed Mar. 23, 1970, Ser. No. 22,060
Int. Cl. B32b 15/08, 25/20

U.S. Cl. 117-75

6 Claims

Surfaces of articles, whose utility involves exposure of the surface to an aqueous marine-fouling environment, are protected from marine fouling thereof by a cured silicone rubber overlying and excluding the aqueous marine-fouling environment from contacting the surface.

Keywords: Coating; Fouling prevention

U.S. Cl. X.R. 117-72; 117-94; 117-132BS;
117-161 ZA; 156-329; 161-206; 161-207

No Figure

3,702,984

UNDERWATER CARTRIDGE DETECTOR

John C. Mollere, Houston, Tex., assignor to Western Geophysical Company of America, Houston, Tex.

Filed Feb. 16, 1971, Ser. No. 115,451

Int. Cl. H04r 13/00

U.S. Cl. 340-8 R

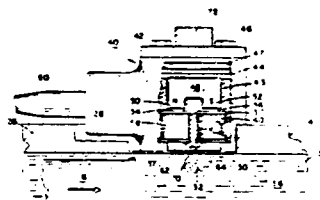
5 Claims

This invention generally relates to known marine seismic prospecting systems employing one or more guns for consecutively firing explosive cartridges underwater. Seismic records are produced in synchronism with the firing of the gun. The cartridges are launched from a cartridge loader positioned on the deck of the seismic vessel into the gun through a flexible hose transporting a stream of water flowing under pressure.

The improved system of this invention employs a reluctance-type pickup detector which is completely sealed and which can withstand high-explosive pressures at close range. A permanent magnet in the detector provides a magnetic flux. The detector is mounted inside a recess in the barrel of the gun to allow the flux path to penetrate into the stream of water flowing through the barrel. The passage of the cartridge through the gap opposite to the recess changes the magnetic flux and generates a strong electric pulse which is transmitted to the recording equipment on the deck of the seismic vessel.

Keywords: Seismic explosive acoustic transmitter

U.S. Cl. X.R. 42-1E; 340-15.5



NOVEMBER 21, 1972

3,703,084

BOOM SYSTEM FOR OIL CONTAINMENT

John B. Nugent, Winthrop, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Jan. 13, 1971, Ser. No. 106,225

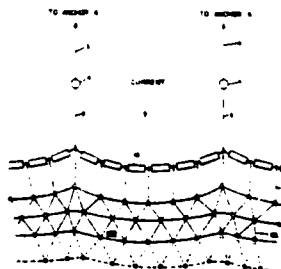
Int. Cl. E02b 15/04

U.S. Cl. 61-1 F

2 Claims

An improved boom system for the containment of oil spills on the surface of water, essentially comprising a multiplicity of intercoupling cells comprising floatatable material, open at top and bottom, forming an in-depth barrier that is wave conformal, the barrier being appropriately stabilized by weights and being coupled to a tether boom, which, in turn, is connected to moorings. Oil carried over the barrier face by waves is trapped in the cells as is oil carried under the barrier face by current flow.

Keywords: Pollutant collection; Pollutant, surface barrier



3,703,085

SHEET PILE SECTION

Alfred Wogerbauer, Linz, Austria, assignor to Vereinigte Österreichische Eisen- und Stahlwerke Aktiengesellschaft, Linz, Austria

Filed Feb. 26, 1971, Ser. No. 119,287

Claims priority, application Austria, March 4, 1970, 2002

Int. Cl. E02d 5/04, 5/05

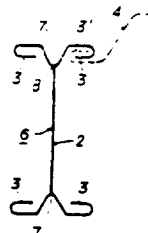
U.S. Cl. 61-60

9 Claims

The invention relates to a sheet pile section for erecting partly or continuously double-walled sheet piles comprising a web and two flanges welded to said web and projecting on either side of said web, each flange-end being designed as one half of a connecting lock for interlocking with an adjacent section, wherein the improvement resides in that the flanges are provided with the same wall thickness over their total extension and with hook-shaped ends which are formed by cold roll bending and bent back towards the web. This section, the web width of which may be freely chosen, is capable of absorbing great axial forces and bending moments. Also, it is capable of exercising high resistance moments with respect to its weight.

Keywords: Pile section connection; Pile, sheet; Pile, steel

U.S. Cl. X.R. 61-61



3,703,207

SUBSEA BUNKER CONSTRUCTION

Edward E. Horton, Portuguese Bend, Calif., assignor to Deep Oil Technology, Inc., Long Beach, Calif.

Filed July 29, 1970, Ser. No. 59,055

Int. Cl. E21b 7/12

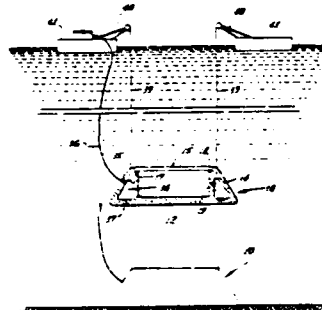
U.S. Cl. 166-5

8 Claims

A protective, oil leak sensitive, subsea well bunker and template construction adapted to be floated, carried, barged or transported to a proposed well site and lowered to a sea floor without special equipment. The bunker construction provides an enclosed chamber for well equipment, the well chamber being adapted to be filled with liquid for maintaining subsurface ambient pressures, and treated for reducing and inhibiting marine life and corrosion, and to provide a selected environment within the well chamber different than the environmental conditions without the chamber to facilitate and enhance working and service conditions within the chamber. The bunker construction includes means for sensing the presence and absence of oil in the chamber.

Keywords: Offshore construction; Seabed foundation; Seabed oil, process structure

U.S. Cl. X.R. 61-46; 61-69



3,703,464

TREATMENT OF OIL SPILLS

Richard L. Fern, Lafayette, Calif., assignor to Chevron Research Company, San Francisco, Calif.

No Drawing. Filed May 20, 1971, Ser. No. 145,487

Int. Cl. C02b 9/02

U.S. Cl. 210-40

10 Claims

A process for treating petroleum product spills is disclosed, whereby coconut husk material is spread on the spill to absorb it. When the spill is on fresh or salt water in the form of a "slick," the coconut husk material coagulates the film, keeps it from sinking, and forms a mass which lends itself to easy removal from the water by mechanical pickup and the like.

Keywords: Pollutant absorption; Pollutant collection

U.S. Cl. X.R. 210-DIG.21

No Figure

NOVEMBER 28, 1972

3,703,811
OIL BOOM WITH CONTINUOUS CONDUIT
THEREETHROUGH

Wilbur C. Smith, North Caldwell, N.J., assignor to Worthington Corporation, Harrison, N.J.

Filed Aug. 28, 1970, Ser. No. 67,858

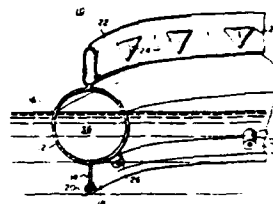
Int. Cl. E02b 15/04; B01d 17/02

U.S. Cl. 61-1 F

8 Claims

An oil boom is disclosed which comprises a continuous length of tubing made of flexible material; a first weighted fin of flexing material suspended from the tubing along its length thereof; and valve means secured to the tubing at predetermined locations along the length thereof for selectively permitting the ingress and egress of fluid to and from the tubing, whereby the tubing can be inflated and deflated. Thus the oil boom may be utilized not only to contain an oil slick floating on water, but also as a conduit to store and/or transfer oil which has been removed therefrom. In the preferred embodiment, the boom is further provided with a second fin of flexible material upstanding from the tubing along its length thereof with the second fin having floatation means therein for floating the boom and for increasing the buoyancy of the oil boom should the boom be lowered into the water. One or more lengths of oil boom of the invention may be joined in end to end relationship by connection means which join the lengths of tubing with fluid communication established therebetween.

Keywords: Pollutant collection; Pollutant, surface barrier



3,703,960
MARINE SEWAGE COLLECTION AND DISCHARGE
SYSTEMS

Kenneth F. Kennedy, 3200 Portage Bay Place East, Seattle, Wash.

Filed Sept. 15, 1970, Ser. No. 72,429

Int. Cl. E03F 5/00

U.S. Cl. 210-121

16 Claims

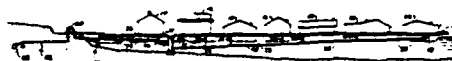
Liquid and solid waste from houseboat dwellings, ships and boats moored to and nearby stationary or floating docks at both fresh and salt water locations is collected and transferred to a sewer system ashore for treatment. This waterfront sewage collection and discharge system is essentially supported and held in place by docks and floats so it is not effected by water level changes caused by tides and waves.

From the outlets of house boats, ships and boats, sewage is directed through flexible couplings and collection pipes, arranged on grade, into partially submerged holding tanks. Each tank is equipped with pumping apparatus to periodically discharge sewage into pipes leading to a sewage system ashore.

Holding tanks are preferably comprised of several like units singly lowered away into the water and sealed together during their convenient installation. Often sewer pipe sections are used as these holding tank units. When docks and floats are changeable in elevation and sufficiently strong, holding tanks are suspended from them. When docks and floats remain essentially at the same elevation, holding tanks may be positioned on the bottom below or nearby them. Plastic pipes are often used and must be held underwater by restraining means to overcome their buoyancy. Expansion and contraction of component assemblies caused by water motion and temperature changes are always compensated for by flexibly joining some members together.

Keywords: Pollutant collection; Pump; Small-craft pier; Small-craft service structure

U.S. Cl. X.R. 141-284; 210-170



DECEMBER 5, 1972

3,704,595

CAISSON FOR SEAWORKS CONSTRUCTION AND TO A METHOD OF USING THE CAISSON

Pierre Launay, Versailles, France, assignor to Compagnie Industrielle de Travaux, Paris, France

Filed July 20, 1970, Ser. No. 56,453

Int. Cl. E02d 23/00; E01d 19/02

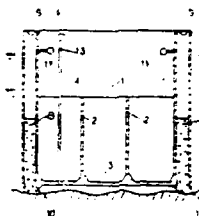
U.S. Cl. 61-50

4 Claims

Keywords: Grouting; Offshore caisson; Offshore construction; Seabed foundation; Seabed material placement

U.S. Cl. X.R. 14-75

A caisson for use in constructing seaworks which comprises a plurality of compartments for receiving ballast and a plurality of enclosures each of which is sealed at the top and bottom by hermetic closures and including between the seals a retractable floor, means such as a compressor being provided to pressurize each enclosure to extend the lower seal, which is flexible, and ducting being provided to inject a binder into granular material, initially loaded on the floors, when discharged on to the lower seals, upon retraction of the floors, the caisson in use being towed to the site, being ballasted to sink it on to the bottom where it rests through the extended lower seals and the granular material then being discharged on to the lower seals where a binder is added to it.



3,704,681

VARIABLE DEPTH, REMOTELY SELECTIVE SEISMIC CABLE DEPTH CONTROLLER

Hollis O. Campbell; John W. Fetrow, and Kim L. Mitchell, all of Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.

Filed June 30, 1971, Ser. No. 158,175

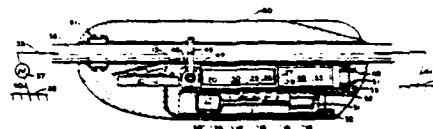
Int. Cl. B63b 21/00; B63g 8/14

U.S. Cl. 114-235 B

4 Claims

Keywords: Seismic streamer cable; Towed body depth control

A remotely selective cable depth controller comprising a movable air piston positioned by an electrical motor, said position controlling the volume of the air enclosure which determines the depth of the controller. The motor is driven by a solid state amplifier of low stand-by power consumption and is operated by command signals which activate a tuned reed switch in combination with a series of memory switches.



3,704,784

FLOATING OIL SKIMMER

Donald E. Craggs, 223 Burnett St., and Richard S. Gillen, 1330 Beaumont St., both of Ventura, Calif.

Filed July 27, 1970, Ser. No. 58,364

Int. Cl. C02b 9/02

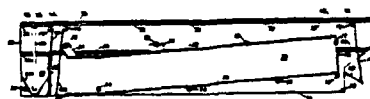
U.S. Cl. 210-242

8 Claims

Keywords: Pollutant removal watercraft; Pollutant, suction removal

U.S. Cl. X.R. 210-DIG.21

A floating oil skimmer for recovering oil from the surface of a body of water is disclosed. The skimmer is comprised of an elongated, box-like skimming unit having an open front equipped with an adjustable inlet lip, an oil and water separation zone, adjustable oil overflow weir, an oil collection sump, and a water outlet gate. A buoyant pontoon section is removably attached at each side of the skimming unit to render the apparatus buoyant. The pontoon sections are easily detachable to facilitate land transport of the device.



DECEMBER 12, 1972

3,705,431

MOORING DEVICES

Samuel Bell, and Leslie Gerald Bullen, both of Dartmouth, Nova Scotia, Canada, assignors to Electric & Musical Industries Limited, Middlessex, England

Filed May 7, 1970, Ser. No. 35,544

Claims priority, application Great Britain, May 7, 1969, 23,191/69

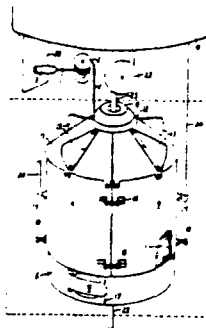
Int. Cl. B63b 21/52

U.S. Cl. 9-8 R

4 Claims

A mooring device includes a tethering cable for tethering a buoyant object, at least one instrument package assembly attached to the buoyant object and through part of which at least the tethering cable passes, connecting cable connecting the buoyant object and the instrument package assembly and formed into a coiled configuration, and means for releasing the instrument package assembly from the buoyant object so that it can be allowed to fall from the buoyant object under its own weight down the tethering cable to a depth predetermined by the available length of the connecting cable. Preferably the arrangement is such that the connecting cable is wrapped round the tethering cable as the instrument package assembly falls and the connecting cable is electrically conductive.

Keywords: Buoy, instrumented; Buoy mooring system; Instrument deployment



3,705,782

DESTRUCTION OF OIL SLICKS

Roger F. Rensvold, Duncan, Okla., assignor to Halliburton Company, Duncan, Okla.

Filed July 22, 1971, Ser. No. 165,354

Int. Cl. F23d 3/18

U.S. Cl. 431-7

4 Claims

An oil slick is destroyed by applying thereto finely divided particles of a compound capable of generating a combustible gas, upon contact with water, allowing the particles to contact the underlying body of water so that bubbles of combustible gas rise through the oil film and admix therewith, so as to enhance the combustibility of the oil, and then igniting the oil-gas mixture to burn and destroy the film, e.g. calcium carbide to form acetylene gas.

Keywords: Pollutant burning

U.S. Cl. X.R. 431-326

No Figure

DECEMBER 19, 1972

3,706,142

SUBMARINE DREDGING APPARATUS

Guido Brunner, Milan, Italy, assignor to Shell Oil Company, New York, N.Y.

Filed Sept. 15, 1970, Ser. No. 72,427

Claims priority, application Italy, Sept. 17, 1969, 22,131 A/69

Int. Cl. E02f 3/92

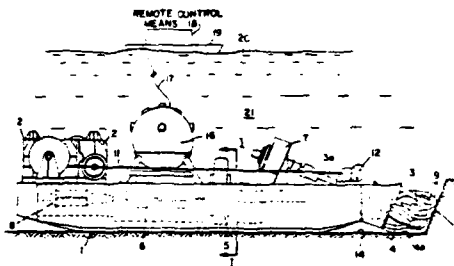
U.S. Cl. 37-56

9 Claims

An underwater dredging device comprising a self-propelled submersible mechanical craft having devices and equipment to carry out dredging work underwater, and means for supplying electrical energy from an external source to operate these devices and equipment, and control devices thereof, the control devices being contained in a watertight bell capable of accommodating one or more operators.

Keywords: Dredge, cutterhead; Dredge propulsion; Dredge, submerged; Seabed trencher

U.S. Cl. X.R. 37-67; 61-69A



3,706,185

APPARATUS FOR REMOVING MARINE GROWTHS AND ROOTS

Merle P. Chaplin, 609 Driver Avenue, Winter Park, Fla.

Division of Ser. No. 764,586, Oct. 2, 1968, Pat. No. 3,540,194.

This application June 23, 1970, Ser. No. 59,830

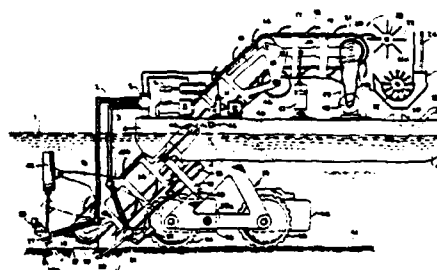
Int. Cl. A01d 45/08

U.S. Cl. 56-9

10 Claims

Apparatus for removing weeds and plants from the bottoms of lakes and waterways, involving injecting water and subsequently compressed air directly below the root systems of such plants, thus forcing them away from the bottom of the lake or waterway. A preferred embodiment of my invention involves a conveyor utilized in concert with this fluid pressure injection, which enables the removed plants to be carried to the surface of the water and disposed of, instead of leaving portions of the uprooted plants in the water to decay.

Keywords: Pollutant, mechanical removal; Pollutant removal watercraft; Water plant removal



3,706,205

APPARATUS AND METHOD OF MAKING AN UNDERWATER CONNECTION BETWEEN A STRUCTURAL MEMBER AND A SUPPORTING PILE

Ernst A. Wald, Dallas, Tex., and Joseph J. Dodson, Jr., Robert La., assignors to U.S. Industries, Inc., New York, N.Y.

Filed March 4, 1971, Ser. No. 120,879

Int. Cl. E02d 5/40, 5/50

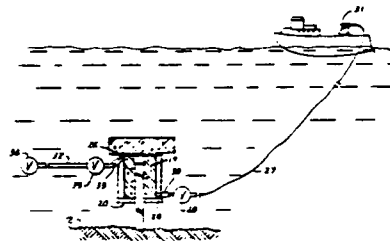
U.S. Cl. 61—46

12 Claims

This invention provides an apparatus and method for making underwater connections between structural members and a plurality of supporting piles. The piles are driven to elevations equal to or below design elevation. A spacer is mounted on the top of any pile that is below design elevation to distribute the load of a structural member among the piles and to support the member at design elevation. Hollow form members having openings are mounted on the underside of the structural member so that the piles will extend into the openings when the structural member is lowered onto the piles. The openings in the form members are sufficiently large to accommodate substantial horizontal displacement of the upper end of the pile thereby allowing the piles to be driven to less stringent tolerance. The space in each opening between each form member and each pile is filled with cement to connect the structural member to the piles.

Keywords: Grouting; Offshore caisson; Pile, structure connection; Seabed foundation

U.S. Cl. X.R. 52-724; 61-53; 61-54; 61-63



3,706,225

DIRECTIONAL INCLINOMETER

Paul B. Stimson, Falmouth, Mass., assignor to The United States of America as represented by the Secretary of the Navy

Filed Oct. 22, 1970, Ser. No. 82,884

Int. Cl. G01p 5/00

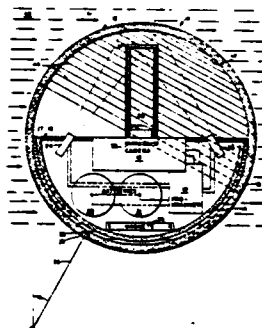
U.S. Cl. 73—189

4 Claims

A device for indicating and recording data representative of direction and degree of inclination of a body or a line or of current direction and velocity by means of a tethered buoyant pendulum is provided. The device includes an outer sphere, one half of which is lined with concentric circles of various colors, and an inner hemispherical chassis which is adapted to float within the outer sphere on a thin layer of liquid between the spheres. The chassis carries photographic equipment and magnets, the former photographing arcs of the concentric circles to indicate current velocity and the latter aligning the chassis so that inclination and direction are indicated by the colors and positions of the arcs photographed.

Keywords: Bouy, instrumented; Current measurement

U.S. Cl. X.R. 33-205.5P; 33-206CB



3,706,382

OIL REMOVAL DEVICE

Ralph Herbert Cross, III, Lexington, Mass., assignor to David Parks Hoult, Wellesley; Ralph H. Cross, III, Lexington and Jerome H. Milgram, Cambridge, Mass.

Filed March 12, 1971, Ser. No. 123,567

Int. Cl. C02b 9/02

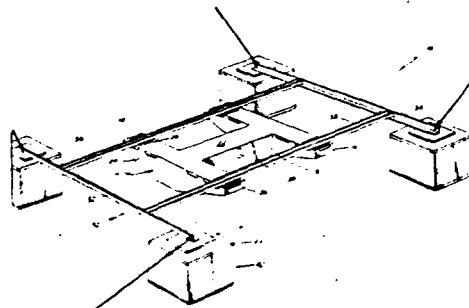
U.S. Cl. 210-242

5 Claims

A buoyant oil-removal device for use with a floating oil-confining barrier on a water surface with oil slicks of substantial thickness floating thereon, the device having oil in-flow ports (of lesser vertical height than the oil slick thickness) with the ports normally floated at a level intermediate the thickness of the oil slick to provide inflow of the water-floated oil slick and to minimize either water or air inflow through said ports whether the water is calm or disturbed by waves, and designed to collect oil from the water surface at a rate which is maximized subject to the requirement that intake of water and air is minimized. The device has a longest overall dimension of not more than one-fourth of the wavelength of the shortest wave of significant amplitude, and includes a generally H-shaped skimmer structure: each arm portion of the structure is of generally rectangular or circular cross section, providing a plurality of inflow ports, each of vertical dimension of the order from 0.04 to 0.2 of the expected slick thickness. Inflow ports preferably are positioned immediately adjacent the top surface of the structure, and are horizontally elongated. The device is provided with a flexible, buoyant suctioning hose communicating with the inflow ports for the removal of oil.

Keywords: Pollutant, suction removal

U.S. Cl. X.R. 210-DIG.21



3,706,507

TIDE-ACTUATED MACHINE

Charles C. Dunbar, 62 Bowdoin Street, Portland, Maine

Filed Aug. 11, 1971, Ser. No. 170,756

Int. Cl. F01d 25/28

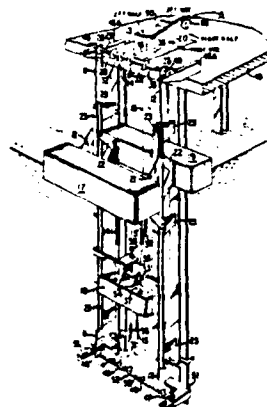
U.S. Cl. 415-7

6 Claims

A machine is disclosed for deriving power from the vertical tidal movement of a floating body whereby power continues to be supplied to a rotatable power shaft at high tide and at low tide and adjacent periods when tidal movement is relatively slight by power supplied by a weight which is controlled so as to descend independently of tidal movement while being lifted by float means during rising tidal movement. A clock mechanism controls weight holding and releasing means in timed relation to tidal movements and means is provided for setting said clock mechanism so as to release the weight prior to high tide and prior to low tide in predetermined timed relationship.

Keywords: Power, tide

U.S. Cl. X.R. 415-5



DECEMBER 26, 1972

3,707,196

SEDIMENT SAMPLE RETRIEVER

William P. Verville, Concord, N.H., assignor to The United States of America as represented by the Secretary of the Army

Filed July 13, 1971, Ser. No. 162,107

Int. Cl. E21b 7/12, 25/00

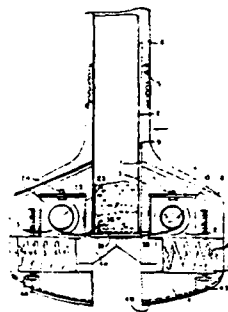
U.S. Cl. 175-5

10 Claims

A subaqueous sediment sample retriever head is affixed to the lower end of a continuous casing, which is positioned about a drill rod string and lowered onto a sampler tube, contiguous with drill rod string. The retriever head houses in oppositely disposed cavities to a central bore, a pair of spools which store and actuate a flexible sealing slide respectively, and two pairs of spring actuated locking lugs which actuate simultaneously with the slide when the retriever head reaches the sampler tube bottom. A sleeve like follower device guides the retriever head onto the sampler tube and retains the sealing mechanism in an open position during mounting. The retriever head is advanced over the sampler by its own weight in conjunction with hydraulic jetting action.

Keywords: Instrument retrieval; Sampler, seabed-drilled core; Sampler, seabed-driven core

U.S. Cl. X.R. 175-240; 175-243



3,707,232

SKIMMERS FOR POLLUTION CONTROL DEVICE

John W. Harrington, 7123 Merrimac Drive, and Edward G. Milne, 7115 Merrimac Drive, both of McClellan, Va.

Filed Oct. 20, 1970, Ser. No. 82,526

Int. Cl. C02b 9/02

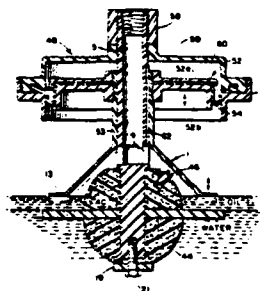
U.S. Cl. 210-242

11 Claims

Floating skimmers slidable on an intake conduit having means counteracting the internal pressure drop normally incident to the intake operation. In one embodiment, the cone member has upper vent openings and an internal cylindrical part around the conduit and depending down to near the bottom of the cone. In a second embodiment, the upper cone member is connected pneumatically to the internal chamber of a bellows and the moveable part of the bellows is connected structurally to the cone. In both embodiments, the upper cone has a horizontal flange and the lower float has a flat surface extending slightly past the flange and positioned close to the flange in normal use.

Keywords: Pollutant, suction removal

U.S. Cl. X.R. 210-DIG.21



3. 1973
3,708,070 to 3,781,778

JANUARY 2, 1973

3,708,070

OIL SKIMMER

Edwin A. Bell, Lake Charles, La., assignor to Cities Service Oil Co.

Filed Oct. 2, 1970, Ser. No. 77,596
Int. Cl. C02b 9/02

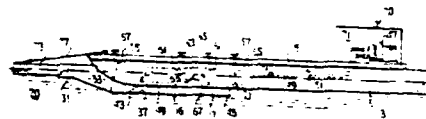
U.S. Cl. 210-242

6 Claims

In order to recover surface oil from a body of water a floating oil skimmer barge is provided with a series of compartments, beginning at the prow of the barge, inflow to each compartment being effected over a respective floating baffle pivotally mounted at its bottom edge to swing into its compartment to a depth determined by the pressure differential across the baffle. Position of the baffle is controlled by pumping water at controlled rates from the bottom of the downstream end of each compartment to thereby cause an effective surface flow between compartments. Surface oil builds up in depth at the downstream end of the last compartment and is collected, substantially free of water, in a recovery chamber which is also provided with a floating baffle and from which oil is pumped at controllable rates.

Keywords: Pollutant collection; Pollutant removal watercraft; Pollutant, suction removal

U.S. Cl. X.R. 210-DIG.21



JANUARY 9, 1973

3,708,982

SYSTEM AND BARRIER FOR CONTAINING AN OIL SPILL

Thomas Nicholas Blockwick, McLean, Va., assignor to Ocean Systems, Inc., New York, N.Y.

Filed Oct. 21, 1970, Ser. No. 79,997
Int. Cl. E02b 15/04

U.S. Cl. 61-1 F

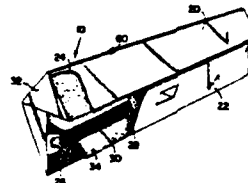
23 Claims

A system for containing an oil spill comprising a plurality of barrier modules each composed of a composite structure having a buoyant upper section and a water absorbing lower section which represents concurrently the sole ballast for said upper section and the subsurface barrier for the module.

Keywords: Pollutant, surface barrier

U.S. Cl. X.R. 61-5; 114-.5F

See: Re. 28,966



3,708,983

APPARATUS FOR CONFINING OIL SPILLS

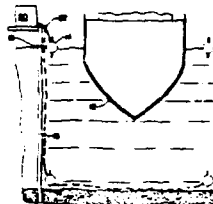
William E. Brown, 132 Milliken Drive, Napa, Calif., and Ed-
mond E. Gilbert, 4990 Alhambra Avenue, Martinez, Calif.
Filed Feb. 16, 1971, Ser. No. 115,603
Int. Cl. E02b 15/04

U.S. Cl. 61-1 F

8 Claims

Apparatus comprising a series of air-retaining structural units connected together in a complete loop so that it will float while surrounding a vessel that may be leaking or spilling oil or some other lighter-than-water fluid. All units are hollow and provided with means for releasing the air so that they will submerge to any desired depth and means for resupplying air so that they can be again raised when needed.

Keywords: Pier, fixed; Pollutant, surface barrier



3,708,985

ARTICULATED MARINE PLATFORM

Ivo C. Pogonowski, and Paul D. Carmichael, both of Houston,
Tex., assignors to Texaco, Inc., New York, N.Y.
Filed Dec. 7, 1970, Ser. No. 95,663

Int. Cl. E02b 17/00; E02d 27/04; B63b 35/44

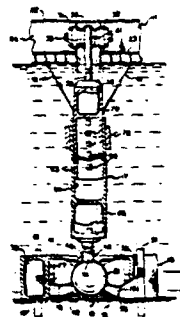
U.S. Cl. 61-46.5

1 Claim

The invention relates to a monopod articulated marine structure for offshore waters, which unit comprises an anchoring base, a work platform which is normally positioned above the water's surface, and an intermediate support column. The latter is operably connected at opposed ends to the respective base and deck or platform whereby the entire unit can be readily floated to and from working sites.

Keywords: Offshore construction; Offshore platform anchor; Offshore platform, floating

U.S. Cl. X.R. 9-8P; 114-5D



3,708,986

IMMERSIBLE RESERVOIR

Jean Roulet, La Celle Saint Cloud, and Armand Cimadevilla, Neuilly (Hauts de Seine), both of France, assignors to Sea Tank Co., Paris, France

Filed July 31, 1970, Ser. No. 59,911

Int. Cl. E02d 29/06

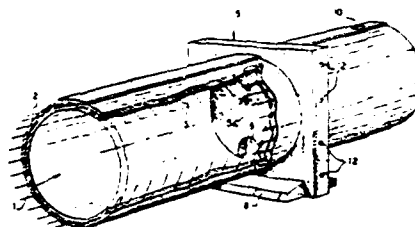
U.S. Cl. 61-46

4 Claims

A reservoir, for example, for liquids capable of being immersed under water and being formed of prestressed concrete. The reservoir has a cylindrical body closed at its ends and lying with its axis horizontal. The reservoir is provided with two partitions which extend from the interior of the body outwards and each of which presents a support foot such that the reservoir can be supported on an emplacement under water at only two points along its length, the partitions inside the body are provided with access openings to permit liquid flow past the partitions and the body may also include other partitions which do not extend out of the cylindrical body and which are also provided with openings for liquid flow.

Keywords: Offshore construction; Offshore storage tank, submerged

U.S. Cl. X.R. 114-0.5T



3,708,987

CONCRETE RESERVOIR FOR UNDERWATER USE

Jean Roulet, 6, Hameau Les Pinsons, 78 La Celle Saint-Cloud, and Armand Cimadevilla, 10 rue Edouard Mortier, Neuilly, both of France

Continuation-in-part of Ser. Nos. 884,584, Dec. 12, 1969, abandoned, and Ser. No. 887,626, Dec. 23, 1969, abandoned.

This application July 23, 1971, Ser. No. 165,060

Int. Cl. E02d 27/38

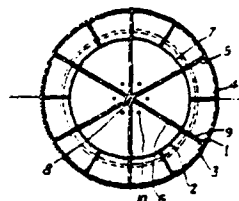
U.S. Cl. 61-46

10 Claims

A reservoir of prestressed reinforced concrete preferably for storing hydrocarbons, adapted so that it can be submerged in the sea so that it rests freely on the bottom thereof, said reservoir comprising a series of cylindrical walls into which radiating partitions fit so that they bear on a central pillar formed by two circular slabs fitting into the walls and the partitions. The bottom of the reservoir has a reinforcement designed to receive a supporting pad or cushion, and the top of the reservoir carries at least one columnar support having a working platform at its upper end. This platform remains above the surface of the sea after the reservoir has been submerged. Each support is in the form of a hollow shaft and serves to carry means connecting the tank with safety elements on the work platform. Further, each shaft is provided with first means which allow the tank to be submerged in the sea so that it can rest freely on the bottom thereof and second means which allow the tank to "breathe" by enabling the safety elements to be brought into communication with the free atmosphere.

Preferably each shaft has a number of cells therein which can be successively flooded with sea water to lower the reservoir to the sea bottom in stages and desirably the reservoir is made from prestressed reinforced concrete.

Keywords: Offshore platform, fixed; Offshore storage tank, submerged; Seabed foundation



260

3,708,988

FENDER ASSEMBLY

Misao Miura, Yokohama, Japan, assignor to Siebu Gomu Kagaku Kabushiki Kaisha, Tokyo, Japan

Filed May 21, 1970, Ser. No. 39,392

Claims priority, application Japan, Sept. 18, 1969, 44/74459

Int. Cl. E02b 3/22

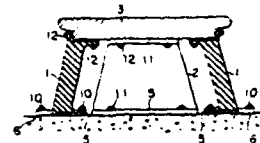
U.S. Cl. 61-48

1 Claim

A fender assembly to be mounted on the surface of a quay-wall as found in harbors or dockyards comprises two pairs of rubber elements each having a plate like trapezoid shape and a rigid impact receiving plate. The pairs of rubber elements are adapted to be secured on to the surface of the quay-wall so that they form together a frustum of a quadrilateral pyramid widening towards the quay-wall surface. The impact receiving plate is rigidly secured on to the top of the pairs of rubber elements.

Keywords: Pier fender

U.S. Cl. X.R. 114-219; 256-1; 267-140



3,709,182

ANCHOR MEANS AND METHOD OF INSTALLING THE SAME

Edward E. Horton, Portomarin Bend, Calif., assignor to Deep Oil Technology, Inc., Long Beach, Calif.

Filed Feb. 24, 1970, Ser. No. 13,536

Int. Cl. B63b 21/24, 21/50

U.S. Cl. 114-206 R

5 Claims

A drilled-in anchor means and method of installing such an anchor means in a subsea formation, the anchor means including prestressed cable and casing means imbedded in cement which fills an anchor hole in the subsea formation. A subsea buoy at a selected distance above the surface of the subsea formation provides a connection to a mooring line which may extend from a platform means or other floatable structure. In the method of installing such an anchor means after a drill hole has been made by using a drill casing, the casing is raised a selected distance and then is subjected to stress by a tension cable cooperable therewith, and then the casing and cable means is lowered into the hole. The casing means and hole are then filled with a cement slurry whereby the drill casing and cable are protected against corrosive action of the water.

Keywords: Embedment anchor; Grouting; Offshore construction; Offshore platform anchor



3,709,184
METHOD AND APPARATUS FOR CLEANING VESSELS
AFLOAT

Henry J. Laney, 5950 LaSalle Avenue, Oakland, Calif.
Continuation-in-part of Ser. No. 748,532, July 29, 1968, Pat.
No. 3,541,988. This application Sept. 28, 1970, Ser. No.
75,961

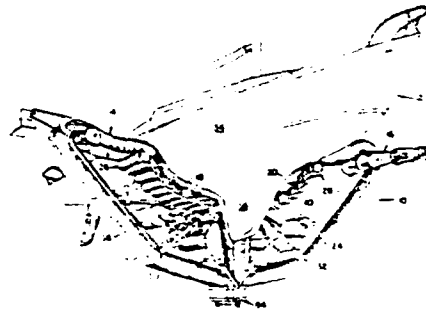
Int. Cl. B60s 3/00

U.S. Cl. 114-222

8 Claims

Method and apparatus for cleaning the underwater hull surface of a floating vessel. Hull cleaning means is arranged in a path along the hull and yieldable carrier means is disposed in supporting relationship with the cleaning means. Means are provided to create relative movement between the vessel and cleaning means. In one embodiment a pincer unit is provided to deflect the tensioned return reach of an endless conveyor and utilize the resulting reaction force for urging the working reach into conformity with the hull surface. In another embodiment vertically spaced actuator arms yieldably urge rotary or belt-type cleaning means into conformity with the hull. In another embodiment flexible, buoyant belts of cleaning elements are oscillated in contact with the hull. In another embodiment a plurality of rotating float elements with peripheral cleaning bristles are arranged in series along a path adjacent the hull surface. In another embodiment flexible, inflatable containers are provided with cleaning means on their inwardly confronting working sides and support means holding the containers so that the working sides yieldably conform to the hull surface of a vessel moved between the containers.

Keywords: Fouling removal; Small-craft service structure



3,710,006
MARINE STREAMER CABLE
Billy W. Davis, Flagstaff, Ariz., assignor to Schlumberger
Technology Corporation, New York, N.Y.
Filed July 1, 1971, Ser. No. 158,838
Int. Cl. H01b 7/12

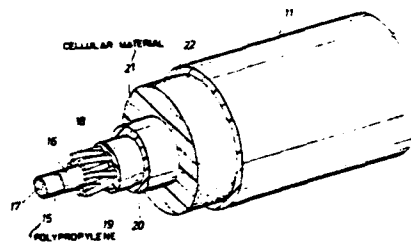
U.S. Cl. 174-101.5

2 Claims

A marine streamer cable of layered solid construction and having substantially the same composition density as sea water, comprising a flotation layer surrounding a cable core having as a central stress member a polypropylene rope made with paralleled fibers held together by an extruded plastic jacket, the use of which minimizes the weight of the cable and serves to greatly attenuate the propagation along the cable of mechanical noise.

Keywords: Seismic streamer cable

U.S. Cl. X.R. 174-113C



3,710,310

SYSTEM FOR DETERMINING DEPTH OF WATER

George J. Moss, Jr., Bethesda, Md., and George M. Walsh, Middletown, R.I., assignors to The United States of America as represented by the Secretary of the Navy
Filed Dec. 23, 1970, Ser. No. 100,932
Int. Cl. G01s 9/68

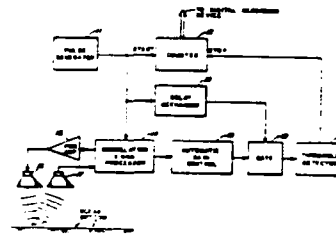
U.S. Cl. 340-3 R

3 Claims

This disclosure is directed to a system for surveying ocean or inland water to obtain depth or slant range information without recording false signals. The system makes use of a single generator that generates a signal which starts a counter and is transmitted into the water. A portion of the generated signal is directed into the delay circuit which delays the signal that controls a gate through which the return signal is processed. The return signal is passed through an automatic gain control and the gate which is controlled by the delayed signal. The delay is sufficient to prevent processing of any false signals. The return signal that passes through the gate is detected and stops the counter which was started upon initiation of the generated signal. The counter output is directed to a digital recorder which indicates a measure of distance in accordance with the amount of time the counter was operational.

Keywords: Sonar, depth sounder

U.S. Cl. X.R. 343-100CL



JANUARY 16, 1973

3,710,577

APPARATUS FOR CONFINING A FLOATABLE LIQUID

Neil Matheson, 14 Spindrift Passage, Corte Madera, Calif.
Filed Nov. 16, 1970, Ser. No. 89,818
Int. Cl. E02b 15/04

U.S. Cl. 61-1 F

6 Claims

In apparatus for collecting and/or retaining a floatable liquid such as oil on the surface of a body of water, an improved barrier section comprising a pair of inflatable tubes, one tube being connected intermediate a depending curtain wall and the other tube, said one tube having a smaller cross section than said other tube but sufficient buoyancy for supporting both the curtain and other tube at positions below and above the surface of the water, respectively; whereby the one tube serves as a keel, pivotal rotation of said one tube bringing said other tube into floating relation with the surface of the body of water and changing the center of buoyancy to develop corrective forces that maintain the barrier section in an upright stable position.

In apparatus for collecting and retaining a floatable liquid such as oil on the surface of a body of water, a towing assembly for a floatable barrier, said assembly comprising a pair of outboard buoyancy tanks and a towing bridle that stabilize the floatable barrier and inhibit yaw, pitch and roll.

Keywords: Pollutant collection; Pollutant, surface barrier

U.S. Cl. X.R. 61-5



3,710,579
PORTABLE COFFER DAM AND METHOD OF MAKING
 Donald H. Killmer, 16940 Lenore, Detroit, Mich., and Paul P.
 Zvonek, 25318 Harmon, St. Clair Shores, Mich.
 Filed May 13, 1971, Ser. No. 142,971
 Int. Cl. E02b 1/00

U.S. Cl. 61-46

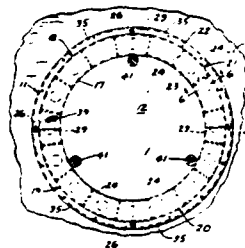
7 Claims

A portable coffer dam consisting of a plurality of rings, each ring consisting of a plurality of sections, each section comprising a pair of side plates spaced by trusses, end plates, attaching means, plastic foam filling between the plates, ballast and a compressed air flotation element in the plastic foam, with exhaust and recompressing means on the flotation element, together with sealing means between the sections and rings.

The method consists of fabricating the ring sections, foaming them on land, floating them to the site and then assembling the sections into rings on the site, lowering the rings into stacked position by adjusting the flotation elements to form the coffer dam.

Keywords: Cofferdam

U.S. Cl. X.R. 61-34



3,710,580
MARINE PLATFORM FOUNDATION STRUCTURE
 George E. Mott, Metairie, La., assignor to Texaco Inc., New
 York, N.Y.

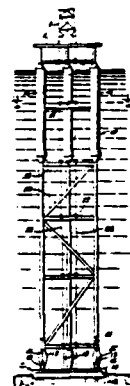
Filed Dec. 24, 1969, Ser. No. 887,853
 Int. Cl. B63b 27/50; E02b 17/00

U.S. Cl. 61-46.5

3 Claims

The invention relates to a marine platform foundation structure adapted to support an operating deck at an offshore site. The structure extends upwardly from the floor of a body of water to the surface, having the lower end operably connected to anchor means disposed at the ocean floor. Said anchor comprises one or more upstanding posts upon which the foundation structure is slidably registered. The connection therebetween permits the foundation structure to oscillate through a limited degree about the anchor in response to displacing forces, while maintaining said lower end horizontally stationary.

Keywords: Offshore platform anchor;
 Offshore platform, floating;
 Offshore platform, leg



3,710,582

UNIQUE SUBSEA STORAGE VESSEL AND UNIQUE METHOD OF LOWERING SAME

Richard E. Hills, Cornopolis; John H. Adams, Pittsburgh; Lloyd E. Anderson, Jr., Pittsburgh; Woodrow E. Blum, Jr., Pittsburgh; Fred W. Hamren, Jr., Sewickley; Harry F. Hoonath, Cornopolis, and John C. Murphy, Pittsburgh, all of Pa., assignors to Pittsburgh-Des Moines Steel Company, Pittsburgh, Pa.

Filed May 17, 1971, Ser. No. 143,798

Int. Cl. B65d 89/10; E02b 17/00

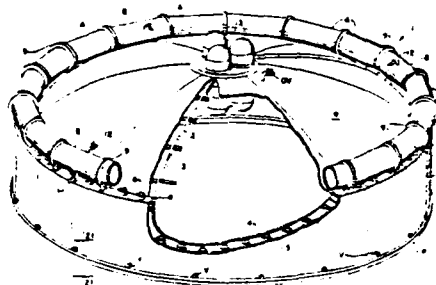
U.S. Cl. 61—46.5

52 Claims

A subsea storage vessel and a method of lowering same comprising, a roofed shell, at least one separate and independent tank means carried by the roofed shell, means connected with at least one of said tank means to control the amount of liquid or other ballast therein to submerge the roofed shell, said at least one tank means singly or in combination being incapable of statically floating the roofed shell with all gas removed from beneath said roofed shell, auxiliary buoyancy means carried by said roofed shell imparting buoyancy thereto, said auxiliary buoyancy means alone being incapable of statically floating the roofed shell with all gas removed from beneath the roofed shell, said at least one tank means and said auxiliary buoyancy means together being of such size and buoyancy as to statically float the roofed shell with all gas removed from beneath the roofed shell.

Keywords: Offshore construction; Offshore storage tank, submerged

U.S. Cl. X.R. 114-.5; 220-18



3,710,943

VARIABLE DISPLACEMENT FENCE FOR OIL SPILL CONTAINMENT AND RECOVERY

William M. Davidson, 57 Briarcliff Road, and Howard W. Cole, Jr., 12 Vale Drive, both of Mountain Lakes, N.J.

Filed March 5, 1970, Ser. No. 16,692

Int. Cl. C02b 9/02

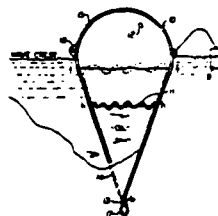
U.S. Cl. 210—242

4 Claims

A flexible, inflatable, elongated barrier useful for the containment, separation and recovery of oil spilt on water is constructed in the form of a tunnel inside of which there is a continuous passage for oil that enters the barrier beneath the waters surface on the upstream side and leaves the barrier on either end of the tunnel. The barrier is weighted at the bottom by suitable ballast means and buoyed at the top by long, continuous air chambers. Lengthwise cables are attached along the top and bottom of the barrier for towing and control purposes. The barrier can be submerged during emergency conditions and is constructed for roll-up on a reel either as a continuous single element or multiplicity of sections.

Keywords: Pollutant collection; Pollutant, surface barrier

U.S. Cl. X.R. 210-DIG.21



3,711,824

METHOD OF PRODUCING UNDERWATER SEISMIC WAVES AND APPARATUS THEREFOR

John R. Farron, Mishawaka, Ind.; Andrew A. Seleno, Royal Oak, Mich.; Matthew Slavin, Pasadena, Calif., and Bernard R. Teitelbaum, Birmingham, Mich., assignors to United Geophysical Corporation, Pasadena, Calif.

Filed Jan. 15, 1971, Ser. No. 106,772

Int. Cl. H04b 13/00, G01v 1/02

U.S. Cl. 340—7 R

24 Claims

A method of producing seismic waves under water is provided. A seismic wave generator is immersed beneath the surface of the water. A continuously varying predetermined command signal is generated for a period of time to operate a motor. The motor, operated in accordance with the command signal, controls the flow of pressurized fluid from the seismic wave generator into the surrounding water. A continuously varying pressure wave is thereby generated in the surrounding water. Changes in pressure in the surrounding water are detected and a feedback signal is generated in accordance with the changes in pressure. The feedback signal is combined with the command signal to produce a control signal which operates the motor to generate the desired pressure wave in the surrounding water.

Keywords: Seismic hydraulic acoustic transmitter

U.S. Cl. X.R. 181-0.5H; 181-0.5VM; 340-17



JANUARY 23, 1973

3,711,968

DREDGE CUTTER HEAD WITH COUNTERBALANCING

Willem Jan van Heijst, Delft, Netherlands, assignor to N. V. Industriële Handelscombinatie, Holland

Filed Nov. 27, 1970, Ser. No. 93,011

Claims priority, application Netherlands, Nov. 28, 1969, 6917936

Int. Cl. E02f 3/90

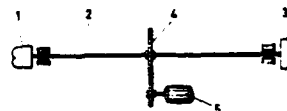
U.S. Cl. 37—67

6 Claims

A cutter dredger with a rotary cutter adjacent the mouth of a suction pipe, in which a second vibratory system balances the first vibratory system comprised by the rotating cutter and its shaft when they encounter resistance during dredging. The drive is applied to the two vibratory systems at their point of interconnection, to reduce the strain on the drive train. The drive may be mechanical, intermediate the length of a torsion shaft, or hydraulic. If hydraulic, a common pump drives motors individual to the two vibratory systems and accumulators are disposed between each pair of the pump and motors. In a compact hydraulic embodiment, the drive and the two driven systems are concentrically interconnected.

Keywords: Dredge, cutterhead

U.S. Cl. X.R. 60-53R; 64-26; 64-27C; 74-57A



3,712,068

**OFFSHORE INSTALLATION FOR PRODUCING,
STORING AND LOADING OIL FROM UNDERWATER OIL
WELL**

Jean Alphonse Eugene Liautaud, 49 Avenue de Segur, Paris,
France

Filed Jan. 22, 1970, Ser. No. 5,087

Claims priority, application France, Jan. 30, 1969,
6901861; April 18, 1969, 6912101

Int. Cl. E02b 17/00, E02d 27/04

U.S. Cl. 61--46.5

11 Claims

An offshore installation for the production, storage and loading of oil from an underwater source. Installation includes an immersed storage tank, a vertical column connected at its bottom to the tank by a universal joint and having its top above the water surface. Platform is connected to upper end of column. Column is maintained in vertical orientation by circularly arranged distributed buoyancy means connected thereto.

Keywords: Breakwater, floating; Offshore mooring structure; Offshore platform anchor; Offshore platform, floating; Offshore storage tank, submerged

U.S. Cl. X.R. 9-8



3,712,069

BEACH PROTECTION SYSTEM

Niels P. Rasmussen, 7th Street at Delaware River, Camden,
N.J.

Filed March 22, 1971, Ser. No. 126,541

Int. Cl. E02b 1/06

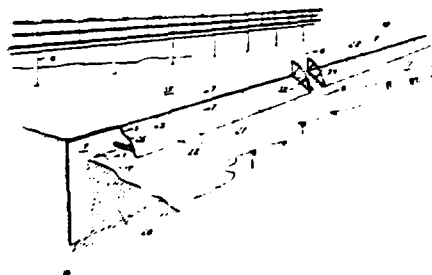
U.S. Cl. 61-49

4 Claims

A beach protection system wherein a bulkhead upstands from a beach extending generally along the high water line, and a ramp, slope or declining wall extends from the bulkhead obliquely downward to ground level on the seaward side of the bulkhead, ground level on the inland side of the bulkhead being raised to approximately the height of the bulkhead.

Keywords: Seawall

U.S. Cl. X.R. 61-3; 61-37



3,712,261

FAIRING

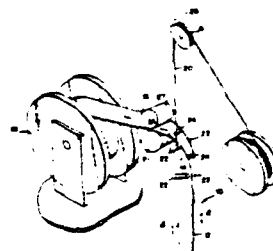
Jack I. McLelland, Palos Verdes Peninsula, and Theodore F. Mangels, Newport Beach, both of Calif., assignors to Ocean Science and Engineering Inc., Washington, D.C.
Filed April 1, 1971, Ser. No. 130,374
Int. Cl. B63b 21/00

U.S. Cl. 114—235 F

12 Claims

A continuously applied fairing consisting of a preformed resilient tubular member of indeterminate length which can be opened and wound as a flat strip. When unwound, it is fed into engagement with a line and is allowed to assume its normal tubular shape encompassing said line.

Keywords: Towing cable



3,712,408

METHOD OF AND APPARATUS FOR CREATING A SHOCK WAVE BENEATH THE SURFACE OF A BODY OF WATER

Raymond Muniz, 78 Versailles, France, assignor to Compagnie Generale De Geophysique, Paris, France

Filed July 31, 1970, Ser. No. 59,983

Claims priority, application France, Aug. 1, 1969, 6926481

Int. Cl. G01v 1/14

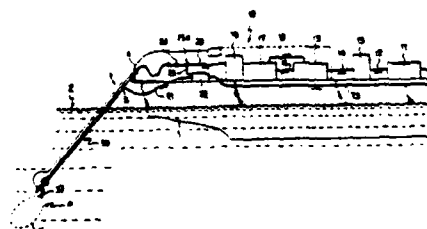
U.S. Cl. 181—5 H

11 Claims

A shock wave is produced in a body of water for seismological study of the underlying ground by abruptly liberating at a desired depth in the interior of the body of water a quantity of steam under pressure so as to form a body of steam in the interior of the water. This body of steam, after its release, condenses violently as a result of its cooling and this violent condensation creates an implosion giving rise to a shock wave suitable for use in seismic prospecting.

Keywords: Seismic implosive acoustic transmitter

U.S. Cl. X.R. 181-0.5NC



3,713,084

**METHOD OF POLARITY DETERMINATION OF MARINE
HYDROPHONE STREAMERS**

William H. Mayne, and Roy G. Quay, both of San Antonio,
Tex., assignors to Petty Geophysical Engineering Company,
San Antonio, Tex.

Filed June 8, 1970, Ser. No. 44,379

Int. Cl. G01v 1/38

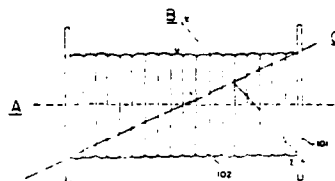
U.S. Cl. 340—7 R

7 Claims

Method of the determination of the polarity of marine seismic hydrophone streamers whereby detectors in said streamers are accurately and quickly excited. Signals from said detectors are recorded before deployment of said streamer into the water. This invention provides for the use of a low frequency sound source in the air near a hydrophone streamer while onboard a seagoing vessel. The low frequency of the pressure source is adequately selected to allow similar responses from the receiving detectors within the hydrophone streamer. In order to achieve this similarity of response, the wavelength emitted from the source must be more than twice the difference of subtracting the maximum source-to-detector distance and the minimum source-to-detector distance of the streamer, as confined compactly onboard.

Keywords: Seismic streamer cable

U.S. Cl. X.R. 181-5NP; 324-133; 340-3T;
340-4A; 340-16P



3,713,085

**ACOUSTIC WAVE RECEIVER FOR UNDERWATER
SEISMIC PROSPECTING**

Jean Laurent, Saint Germain en Laye, and Claude Duconge, Le
Vesinet, both of France, assignors to Institut Francais du
Petrole, des Carburants et Lubrifiants, Rueil Malmaison,
France

Filed Dec. 29, 1970, Ser. No. 102,416

Claims priority, application France, Dec. 30, 1969, 6945582

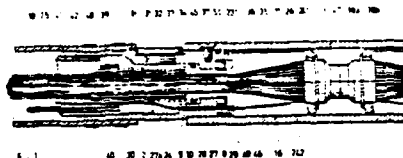
Int. Cl. G01v 1/20

U.S. Cl. 340—7

5 Claims

Acoustic wave receiver for underwater seismic prospecting comprising a plurality of tubular sections filled with liquid and containing coupled pressure sensors, at least one impedance adapter, electric wires interconnecting said sensors, a multiconductor cable and towing cables, end couplers at the extremities of section comprising means for anchoring the towing cables and means for electric connection to the multiconductor cable, said sections being coupled by means of coupling sleeves surrounding the end couplers in a tight manner.

Keywords: Seismic streamer cable



JANUARY 30, 1973

3,713,298

NAVIGABLE DAM

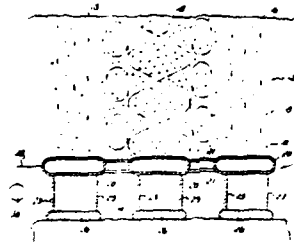
Morris Mendelson, 16156 Axley, Southfield, Mich.
Filed June 7, 1971, Ser. No. 150,426
Int. Cl. E02b 7/02

U.S. Cl. 61-30

2 Claims

A portable navigable dam for impeding or directing the flow of water without interfering with the use of the upper surface of the water such as for instance passage of sailing vessels. The navigable dam takes the form of a number of elongated tubular structures and in the preferred embodiment of this invention these are disposed on or near the bottom of a body of water generally paralleling the boundary between salt water and fresh water bodies. Each of the tubular structures has elongated openings formed in its upper surface for releasing air from within the tubular structure at a high rate, while preventing entry of water therethrough. The release of air into the water results in a pumping action that moves a very large volume of water upwardly in a relatively short time, forming a curtain of water which impedes the movement of the salt water into the fresh water. A method incorporating the navigable dam for directing tidal waters in a desired direction is also disclosed.

Keywords: Channel barrier; Tidal estuary
water quality; Tidal inlet



3,713,410

FLOATING BARRAGE

Roger Ducrocq, and Charles Moreau, both of Clermont-Ferrand, France, assignors to Pneumatiques Caouthchouc Manufacture Et Plastiques Kleber-Colombes, Colombes, France

Filed March 22, 1971, Ser. No. 126,511

Claims priority, application France, March 30, 1970, 7010268

Int. Cl. B63b 35/00

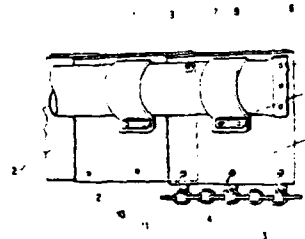
U.S. Cl. 114-5T

8 Claims

Floating barrage for containing oil spills and the like comprises components consisting of inflatable bags from each of which a plurality of overlapping interlinked panel members are suspended.

Keywords: Pollutant, surface barrier

U.S. Cl. X.R. 61-1F



3,713,415
SHIP MOORING ARRANGEMENT AND A SUBMERGED
OIL STORAGE TANK

Yukio Arita, and Katsuya Ninomiya, both of Hiroshima,
Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha,
Tokyo, Japan

Filed Feb. 25, 1971, Ser. No. 118,921

Claims priority, application Japan, March 5, 1970,
45/18304

Int. Cl. B63b 21/04, 21/00

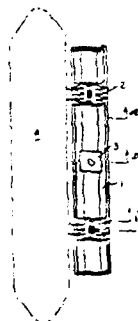
U.S. Cl. 114-230

2 Claims

A ship mooring arrangement comprising a movable fender system capable of varying the spring constant optionally by selecting the dimensions and shapes of a fender mechanism and a ballast tank type of weight; said weight is so constructed to be filled with water and to be sunk, a storage tank fixed at the sea bottom by means of the anchoring piles, a main frame secured to the foot of said oil storage tank by fixing rigidly the posts of said frame to said anchoring piles.

Keywords: Offshore mooring structure; Offshore platform, fixed; Offshore storage tank, submerged; Offshore structure fender

U.S. Cl. X.R. 61-48; 114-219



FEBRUARY 6, 1973

3,714,788
PLATFORM BUOYANT UNDERSTRUCTURE
George E. Mott, Metairie, La., assignor to Texaco Inc., New
York, N.Y.

Filed April 30, 1970, Ser. No. 33,407

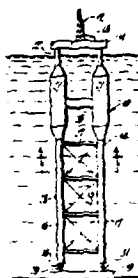
Int. Cl. B63b 21/50; E02b 17/00

U.S. Cl. 61-46.5

1 Claim

The invention relates to a floatable understructure for a marine platform or deck located in an offshore body of water. The understructure includes an elongated rigid column unit incorporating buoyancy means so disposed to permit the attitude of the structure to be controlled. In the operating position, one end of the understructure is operably connected to an anchor resting on the ocean floor. The structure other end is buoyed up such that the unit assumes a generally upright disposition in the body of water with a portion protruding beyond the water's surface to support the working deck or platform.

Keywords: Offshore platform anchor; Offshore platform, floating; Offshore platform leg



3,714,789

AUTOMATICALLY SELF-REGULATING VARIABLE-STROKE, VARIABLE-RATE AND QUIET-OPERATING PILE DRIVER METHOD AND SYSTEM

Stephen V. Chelminski, West Redding, Conn., assignor to Bolt Associates, Inc., Norwalk, Conn.

Filed Dec. 29, 1970, Ser. No. 102,325
Int. Cl. E02d 7/02

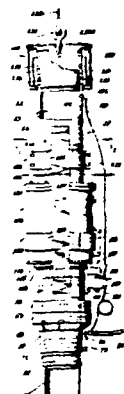
U.S. Cl. 61-53.5

17 Claims

Automatically self-regulating variable-stroke, variable-rate and quiet-operating pile driver method and system are disclosed in which a massive piston weight is bounced upon a cushion of pressure fluid, the pile driver advantageously being adapted for operation in four different modes: (1) only double-acting, (2) single-acting automatically converting to double-acting at maximum stroke travel, (3) only single-acting, (4) pre-stressing plus impacting plus thrusting mode, and (5) pile extraction mode. The prolonged down-and push resulting from the pressurized fluid-cushioned bouncing action is more effective than the conventional sharp hammer-type blow resulting from impact of one solid mass against another. When the pile being driven encounters softer strata in the earth, in the single-acting mode, the stroke of the piston weight automatically shortens while the number of bounces per minute automatically increase thus increasing the rate of the quiet powerful bounce thrusts for driving the pile faster, and when harder strata are encountered, the piston weight automatically bounces higher providing a longer stroke with fewer bounces per minute, thus increasing the force of each quiet powerful thrust for overcoming the increased impedance being encountered. In the double-acting mode, when harder strata are encountered, the velocity and stroke length of the piston weight increase automatically to deliver more powerful thrusts. A relatively large number of driving thrusts per minute can be provided in the double-acting mode by changing the head plug mass to shorten the maximum stroke length to increase the frequency of thrusts per minute. By virtue of the pressure fluid bouncing action imparted to the massive piston weight, the noise of metal-to-metal contact blows can be avoided, and in addition a muffler housing surrounding the ports through which the expanded pressure fluid is released muffles the sound of the flow of the fluid, such as air or steam; this muffler also serving to separate lubricating oil from the released fluid. A cylinder bottom assembly below the bounce chamber is coupled to the pile being driven to transmit the quiet powerful bounce thrusts to the pile, moving in accordance with the pile motion, and a driving fluid storage chamber and valve mechanism associated with this assembly control the flow of the pressure fluid in an automatically self-regulating manner to seek the most effective driving action from moment-to-moment as the pile encounters different strata. If desired, the bouncing action of the cushion of pressure fluid can be altered to permit the piston weight to strike bottom slightly to provide the driving mode (4) above. A self-contained lubrication system may be actuated by the pressure impulses in the bounce chamber.

Keywords: Pile driver, impact; Pile extractor

U.S. Cl. X.R. 173-1; 173-91; 123-115



272

3,714,830
WATER SAMPLING DEVICE
 Robin S. Keir, San Diego, Calif., assignor to The United States
 of America as represented by the Secretary of the Navy
 Filed March 26, 1971, Ser. No. 128,395
 Int. Cl. G01n 7/10

U.S. Cl. 73-425.4 R 2 Claims

A water sampling device capable of carrying a conventional laboratory-type flask container having a neck opening and a bottom opening with means for closing each of said openings to capture a water sample therein at a preselected water depth whereby the contamination problems of transferring the water sample to another container for laboratory analysis are avoided.

Keywords: Sampler, water

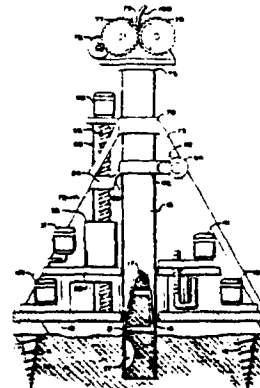


3,714,996
**UNDERSEA CORING MACHINE WITH MEANS
 FOR SEPARATING SAMPLES**
 Ernest Blaney Dane, Jr., 57 Tyler Road,
 Belmont, Mass. 02178
 Filed Aug. 10, 1971, Ser. No. 170,455
 Int. Cl. E21b 7/12; E21c 19/00
 U.S. Cl. 175-6 10 Claims

The machine, intended for operation at ocean depths up to several miles, comprises a generally triangular platform with a motor-operated auger at each corner by which it may be attached to the ground, and a centrally situated coring tube with which are associated means for raising and lowering the tube, and means for inserting plastic spacers between successive samples. The whole is connected by a cable to a ship. The tube is driven and withdrawn by operation of an eccentric vibrator coaxing with a biasing lead screw and flexible strut. A supply of saucer-like disks is contained in a magazine situated vertically and parallel to the sampling tube, and transfer means are provided to slide the bottom disk out of the magazine, and to press it up into the bottom of the sampling tube past the check valve in its foot.

Keywords: Instrument deployment; Sampler, seabed-driven core

U.S. Cl. X.R. 175-55; 175-240; 175-245



DEVICE FOR REMOVING OIL SLICKS

Filed May 6, 1970, Ser. No. 35,154

Int. Cl. C02b 9/02

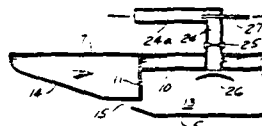
U.S. Cl. 210-242

12 Claims

Oil floating on a body of water is collected by moving a shallow-draft water craft, such as a barge, having a sternwardly slanted bow section and below the water line an ingress opening in or near the bow section through an oil sick. The slant of the bow section forces oil in its path downwardly thereby causing the oil, possibly intermingled with water, to flow as a flat layer along the bottom of the barge. As the oil reaches the ingress opening it is propelled into a hold of the barge due to the pressure differential between the outside and the inside of the barge. Oil thus accumulating in a hold of the barge may be removed therefrom from time to time and clear water as may also enter the hold is returned to the body of water.

Keywords: Pollutant removal watercraft;
Pollutant, suction removal

U.S. Cl. X.R. 210-DIG.21



FEBRUARY 13, 1973

AQUATIC SEDIMENT AND POLLUTION MONITOR

Roger Y. Anderson, 5014 Guadalupe Tr., N.W., Albuquerque,
N. Mex.

Filed March 25, 1971, Ser. No. 127,891

Int. Cl. G01n 1/20

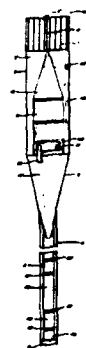
U.S. CL 73-61 R

15 Claims

An aquatic sediment and pollution monitor adapted to be positioned in a body of water comprising an elongated, vertically alignable, collecting tube having an open upper end and a closed lower end for collecting, over a long period of time, the natural materials and polluting substances that accumulate in the body of water. A generally funnel-shaped magnifying cone is positioned with the small diameter end thereof extending into the open end of the collecting tube to magnify the amount of sediment and pollution collected. A baffle is positioned in the magnifying cone adjacent the large diameter end thereof for minimizing turbulence in the collecting tube and for the entraining entrance thereto of large organisms. Means are provided for automatically marking, at regular intervals, the quantity of sediment and pollution accumulated in the collecting tube during such intervals.

Keywords: Pollutant measurement; Sampler, suspended sediment; Sedimentation measurement

U.S. Cl. X.R. 73-170A: 73-425.4R



3,716,142
LIQUID SURFACE SWEEPING APPARATUS
 Ralph A. Bianchi, Lexington, Mass., assignor to JBF
 Scientific Corporation, Burlington, Mass.
 Filed June 14, 1971, Ser. No. 152,662
 Int. Cl. C02b 9/02

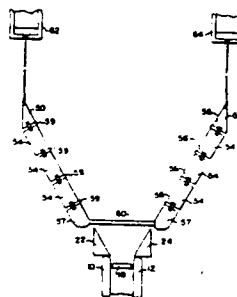
U.S. Cl. 210—242

11 Claims

Buoyant sweeping members for use with a craft designed to skim floating materials, such as oil or oil-soaked sorbents from the surface of a body of water are described. These members are of two general types. The first is roughly triangular in shape when floating in the water and viewed from above. It has one planar edge surface and the underbody is curved both laterally away from this planar edge and also longitudinally. To form a sweep, two of these members are located with their planar surfaces opposing each other and converging in the direction of water flow. The points of the triangular shape point upstream and the members are articulated about a generally horizontal axis. A second member, used in conjunction with the first is generally rectangular in shape with a single planar edge surface. This member is laterally curved from the lower edge of the planar surface upwardly to the outer edge of the member. It is joined with members of the type described to form elongated booms for concentrating floating materials to then be skimmed from the water surface.

Keywords: Pollutant collection; Pollutant, surface barrier

U.S. Cl. X.R. 210-DIG. 21



3,716,824
SIDE LOOKING SONAR APPARATUS
 John A. Dorr, Crofton Park, and Henry M. Gruen, Annapolis,
 both of Md., assignors to Westinghouse Electric Corpora-
 tion, Pittsburgh, Pa.

Filed Oct. 17, 1969, Ser. No. 867,170

Int. Cl. G01s 9/66

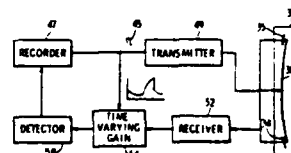
U.S. Cl. 340—3 R

7 Claims

An arcuate side looking sonar transducer transmits acoustic energy to the sea bottom. Reflected acoustic energy is received by a pair of relatively short receiver transducers positioned over the ends of the transmitter transducer.

Keywords: Sonar, side looking

U.S. Cl. X.R. 340-8R



375

3,716,825

CONTOUR MEASURING APPARATUS ESPECIALLY FOR USE IN A SEA BOTTOM ELEVATION MEASUREMENT

George M. Walsh, Middletown, and Mark A. Chramiec, Newport, both of R.I., assignors to Raytheon Company, Lexington, Mass.

Continuation of Ser. No. 785,102, Dec. 19, 1968, abandoned.

This application July 30, 1970. Ser. No. 64,114

Int. Cl. G01s 9/66

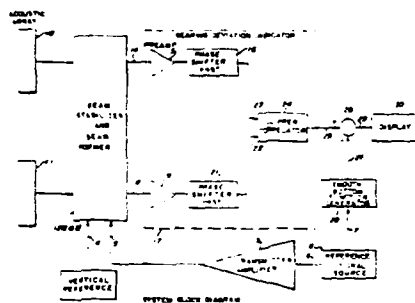
U.S. Cl. 340-3 R

8 Claims

A contour measuring apparatus for determining the elevation of sea bottom features with respect to a reference plane. The apparatus comprises means for projecting a burst of acoustic energy upon a subsurface contour. As the burst leading edge and the following elements roll over the sea bottom, respective portions of the burst will be reflected back at an angle $\psi(t)$ which varies as a function of time. When a sudden elevation is encountered, the reflected portions of the echo pulse are reflected at an angle $\psi(t) + \Delta\phi$. Consequently, the signals detected at spaced transducer phase centers will show a change in their phase relationship within a given time interval. As seen in an acoustic receiver the variations in contour elevation h appear as changes in the angle of arrival $\psi(t)$ as represented by the incremental angle $\Delta\phi$. Thus, the receiver signal representation of $\psi(t)$ for a flat horizontal reference plane must be subtracted from $\psi(t) + \Delta\phi$ in order to determine $\Delta\phi$.

Keywords: Sonar, side looking

U.S. Cl. X.R. 343-5CM



FEBRUARY 20, 1973

3,716,993

MODULAR OFFSHORE STRUCTURES SYSTEM

Maurice N. Sumner, 1301 Dies, Houston, Tex.

Continuation-in-part of Ser. No. 649,889, June 29, 1967, Pat.

No. 3,575,005. This application Jan. 18, 1971, Ser. No.

107,288

Int. Cl. E02b 17/04; E02c 5/00

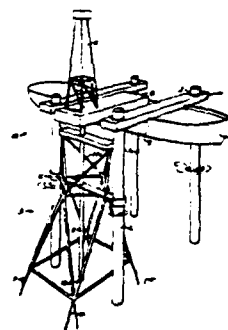
U.S. Cl. 61-46.5

24 Claims

A modular-like system of offshore structures for imparting flexibility to the offshore exploration and production and transportation industries so that exploration, production and development work can take place over a large range of marine depths and operational circumstances with one or more marine vessels, a family of spacing-jack-and-coupling means for stabilizing the vessels and for coupling them thereto, and a family of supporting stationing structures or modules which are used for lending support to the stabilized vessel or to operational structures established by the vessel.

Keywords: Offshore platform, fixed; Offshore platform, jack up; Offshore platform, leg; Seabed foundation

U.S. Cl. X.R. 61-65; 114-.5



3,716,994
**ASSEMBLY SYSTEM FOR A DETACHABLY CONNECTED
 OFFSHORE MARINE STRUCTURE**

Ivo C. Pogonowski, Houston, Tex., assignor to Texaco, Inc.,
 New York, N.Y.

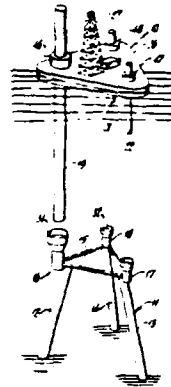
Filed June 28, 1971, Ser. No. 157,152
 Int. Cl. E02b 17/00

U.S. Cl. 61-46.5

6 Claims

The invention relates to an offshore marine structure characteristic of the kind adapted to be positioned in a body of water. The structure includes a lower pedestal that is anchored, piled or otherwise firmly fixed to the floor of the body of water. A deck section normally elevated above the water's surface, is supported by a plurality of downwardly extending columns or legs that connect it to said lower pedestal. The respective members are brought into unitary engagement by supporting at least one of said legs from the buoyant deck while the latter is floating. The said one leg thereby engages its lower end in a docking receptacle carried on the anchored pedestal. Thereafter, by rotating the deck at the water's surface in such a manner as to pivot about the single connected leg, the remaining support legs are brought into correct alignment as to be lowered and similarly engage other docking receptacles at the pedestal.

Keywords: Offshore construction; Offshore platform, jack up; Seabed foundation



3,716,998
**MEANS FOR NEUTRALIZING SUBMARINE
 EROSION**

Flemming Lerche-Svendsen, Skovholmsvej 11, Charlotten-
 lund, Denmark, and Erik Nielsen, Strandvejen 15,
 Frederikshavn, Denmark

Filed July 19, 1971, Ser. No. 163,809
 Int. Cl. E02b 3/12

U.S. Cl. 61-38

7 Claims

A means for neutralizing submarine erosion by providing materials which are obtainable at a low cost easily positioned on the sea-bed, and resistant to the action of the water. This is achieved when endless strips or narrow lengths of thin, non-woven fabrics, having a maximum density somewhat higher than the specific gravity of the water, are positioned near the sea-bed, in bundles parallel to each other, and in the main parallel to the sea-bed, the strips in each bundle being joined together at intervals, and the individual lengths of the strips in a bundle between one joining point and the following being varied at least in the case of some of the strips.

Keywords: Artificial seaweed; Fabric mat;
 Low-cost shore protection



3,716,999

**MECHANICAL BUFFER OF RESILIENT MATERIAL
SUCH AS RUBBER, IN PARTICULAR FENDER FOR SHIPS**
Cornelis G. Middelbeek, 12 Gooland, Nootdorp, Netherlands

Filed April 14, 1970, Ser. No. 28,372

Claims priority, application Netherlands, April 21, 1969,
6906141

Int. Cl. E02b 3/22

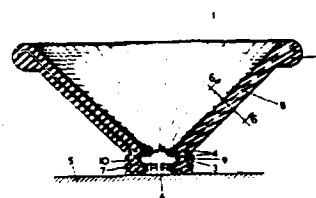
U.S. Cl. 61—48

14 Claims

A resilient buffer such as a fender for ships having a frusto-conical cup-shaped body of resilient material. Rigid reinforcement bars are preferably moulded within the conical wall so as to prevent buckling of the walls. Circumferential rings prevent radial movement of adjacent bars at only one end so the other ends are free to spread apart when the resilient material is deformed by an axial pressure.

Keywords: Pier fender

U.S. Cl. X.R. 267-140



3,717,001

OFFSHORE STORAGE STRUCTURE

William A. Tam, Warrenville, Ill., assignor to Chicago
Bridge & Iron Company, Oak Brook, Ill.

Filed Dec. 27, 1971, Ser. No. 212,224

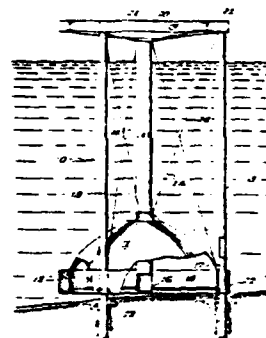
Int. Cl. E02b 21/00; B63b 35/44; B65g 87/00

U.S. Cl. 61—46.5

8 Claims

Stable offshore storage structures including: a first, ringwall-reinforced tank disposable adjacent the sea floor; a vertically extending shaft centrally disposed within the first tank and extending upwardly therefrom; a second, annularly-shaped tank disposable above the first tank, through the central orifice of which the shaft may pass; at least three support legs which may pass through leg retaining walls associated with both the ringwall and the second tank; and, means for securing and vertically moving the legs relative to the ringwall and second tank. There may also be provided means associated with the second tank for securing and vertically moving it relative to the shaft.

Keywords: Offshore platform, jack up; Offshore storage tank, emergent



3,717,003

TRENCHING APPARATUS

Howard J. Estes, Jr., and Jack O. Hill, Houston, Tex., assignors to Oceanoics, Inc., Houston, Tex.

Filed Oct. 26, 1970, Ser. No. 83,806

Int. Cl. E02f 5/02; F16l 1/00

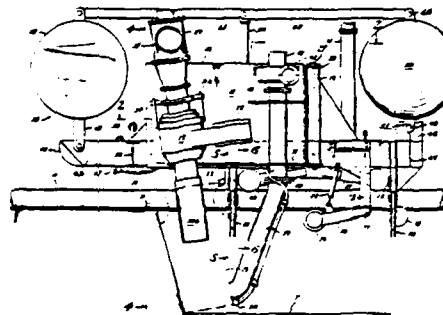
U.S. Cl. 61-72.4

24 Claims

A pair of rotatable cutter heads are supported from the carriage for disposal at least partially beneath the pipeline as the carriage moves forwardly along the pipeline, and cuttings dug by the cutter heads are removed from the trench through suction conduits.

Keywords: Seabed pipeline placement;
Seabed trencher

U.S. Cl. X.R. 37-63



FEBRUARY 27, 1973

3,718,001

WAVE RIDING WATER BARRIER

John D. Harper, P.O. Box 83, Route 1, Elgin, Ill.
Filed Feb. 17, 1971, Ser. No. 116,166

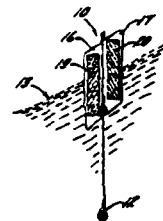
Int. Cl. E02b 15/04

U.S. Cl. 61-1 F

2 Claims

A floating barrier formed of flexible material having flexible buoyancy pockets on either side of the barrier fitted with float elements slightly smaller than the pockets so that the elements can move relatively in a vertical direction in response to wave action without moving or bending the barrier itself. The float elements are protected in sealed plastic bags.

Keywords: Pollutant, surface barrier



3,718,206
AMPHIBIOUS SEISMIC EXPLORATION VEHICLE AND METHOD

John J. Babb, and Marvin G. Bays, both of Jackson, Miss., assignors to Delta Exploration Company, Inc., Jackson, Miss.
 Filed Jan. 18, 1971, Ser. No. 107,247
 Int. Cl. G01v 1/14

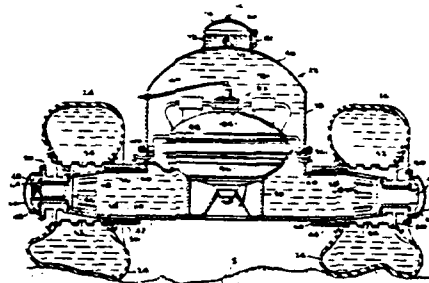
U.S. Cl. 181-5 VM

27 Claims

A seismic signal providing vehicle is provided in the form of pneumatic tires rollingly supporting a hollow metal casing with a body of liquid on the interior of the casing communicating with the interior of the tires and an expandible acoustic signal transducer being positioned in the body of liquid in the casing for activation for transmitting a pressure pulse to the surface of the tires from which the signal is radiated into the environmental surroundings of the tires either on dry land or under water.

Keywords: Seismic explosive acoustic transmitter; Seismic survey method; Seismic vibratory acoustic transmitter

U.S. Cl. X.R. 181-.5EC; 181-.5H



3,718,207
METHOD AND APPARATUS FOR PROVIDING UNDERWATER SEISMIC ENERGY SIGNALS

John J. Babb, Jackson, Miss., assignor to Delta Exploration Company, Inc., Jackson, Miss.
 Filed Dec. 10, 1969, Ser. No. 883,809
 Int. Cl. G01v 1/38

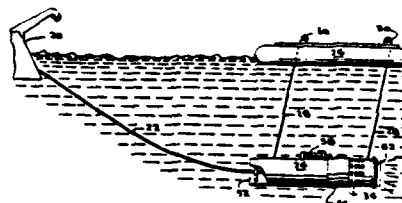
U.S. Cl. 181-5 H

12 Claims

A seismic energy source provided in the form of a hollow cylindrical member supporting a drum plate on its rear end and connected to a tow line on its forward end for movement through a body of water with rapid-actuating valve means on the rear of the cylindrical member which, when closed, entraps a large mass of water the inertia of which resists continued movement of the cylindrical member; a piston and cylinder assembly is connected to the tow line by a piston rod so that the momentum of the towing vessel moves the piston with respect to the cylinder to pressurize a pressure accumulator to a desired pressure at which point a release coupling between the rod and the tow line is activated to permit the rod to be forcefully urged at a high speed rearwardly to strike the drum plate to provide a seismic signal.

Keywords: Seismic hydraulic acoustic transmitter

U.S. Cl. X.R. 116-137; 181.5JM; 340-7; 340-12



3,718,570
CATHODIC PROTECTION ANODE WITH SECTIONS
REPLACEABLE UNDERWATER

Isidore Geld, Flushing, N.Y., assignor to the United States
of America as represented by the Secretary of the Navy
Filed June 1, 1970, Ser. No. 42,169
Int. Cl. C23K 13/00

U.S. Cl. 204-196

1 Claim

An impressed current anode assembly for cathodic protection that includes several anode sections clamped to a bus conductor in the assembly. Each anode section is separable from the anode assembly and replaceable by a scuba diver equipped with simple hand tools.

Keywords: Cathodic protection; Corrosion prevention

U.S. Cl. X.R. 204-290F



MARCH 6, 1973

3,719,048
OFFSHORE STRUCTURE WITH STATIC AND DYNAMIC
STABILIZATION SHELL

Christian Arne, Chicago, and Erik E. Brogren, Glen Ellyn,
both of Ill., assignors to Chicago Bridge & Iron Company,
Oak Brook, Ill.

Filed Nov. 18, 1971, Ser. No. 199,855
Int. Cl. B65g 5/00; E02b 17/00

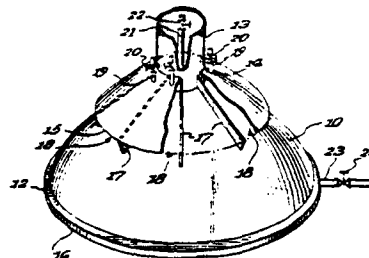
U.S. Cl. 61-46.5

16 Claims

An offshore structure floatable to a site for positioning by submergence on the floor of a body of water and subsequently raising it having a domed roof shell enclosing a volume therebelow, said roof shell being open at the bottom and having a peripheral ballasting ring which provides a substantial righting moment against significant tilting of the structure while the ballasting ring is at least partly above water level, a stabilization shell mounted adjacent to the upper part of the roof shell in fixed position relative thereto by connecting means joined to the roof shell, said stabilization shell being open at the bottom and enclosing a volume between the shells, a plurality of spaced apart bulkheads extending vertically between the two shells thereby dividing the space between the shells into compartments, and means to remove air from beneath the roof shell and from said compartments in submerging the structure.

Keywords: Offshore storage tank, submerged

U.S. Cl. X.R. 61-46.5; 61-69; 114-.5T



3,719,049
CORROSION PREVENTING APPARATUS AND METHOD
Clarence W. Shaw, Metairie, and George R. Smith, Ponchatou-
la, both of La., assignors to Donald W. Darnett, Covington,
La., by said Smith

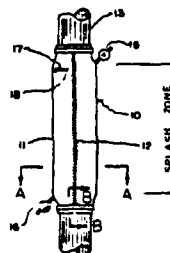
Filed Dec. 22, 1969, Ser. No. 873,755
Int. Cl. E02d 5/60; E04b 1/64

U.S. Cl. 61-54

5 Claims

The present invention pertains to a splash zone coating system for the protection of metallic surfaces subject to active corrosion. More specifically, the present invention pertains to novel means for covering and coating metallic structures, e.g., pipe leg supports of an offshore oil well structure, from seawater corrosion in the splash zone of the structure which is that area subjected to intermittent contact by seawater.

Keywords: Coating; Corrosion prevention;
Pile protection



MARCH 13, 1973

3,720,062

LIQUID CONFINING AND COLLECTING APPARATUS

William T. Mack, 2527 Azalea, Tyler, Tex.
Filed July 9, 1970, Ser. No. 53,586
Int. Cl. E02b 15/04; B01d 21/00

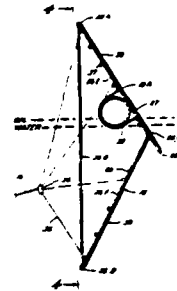
U.S. Cl. 61-1 F

16 Claims

There is disclosed an elongate, impervious barrier which is flexible intermediate its ends and has upper and lower faces which converge forwardly to intersect on its front side. Buoyant means is carried by the barrier to normally maintain it in a generally upright position within a body of water and with the intersection of the upper and lower faces below a lighter phase thereof.

Keywords: Pollutant collection; Pollutant, surface barrier

U.S. Cl. X.R. 210-242



3,720,066

INSTALLATIONS FOR SUBMARINE WORK

Robert N. Vilain, Maisons-Alfort, France, assignor to Compagnie Francaise D'Entreprises Metalliques, Paris, France
Filed Nov. 20, 1969, Ser. No. 878,460
Int. Cl. B63b 35/44; B65d 87/08; E02d 17/00

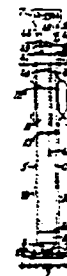
U.S. Cl. 61-46.5

10 Claims

An offshore drilling platform has a column which can be articulated by a universal joint to a base anchored to the seabed. The column is subdivided into a plurality of superposed ballasting compartments. Means are provided for external control, from a compressed air source, of the flooding or emptying of at least one of the compartments. One compartment close to the articulated end of the column can be flooded during positioning the structure so that the water compresses the air before it. Means are provided to allow the air to escape thereafter or be further pressurized to drive out the water. Floats which can be partly filled with water can be arranged radially around the column and emptied during the setting up operation. Oil dashpot type shock-absorber means can be provided for damping impact against the base.

Keywords: Offshore construction; Offshore platform, floating

U.S. Cl. X.R. 9-8; 114-.5F



3,720,067

**METHOD FOR BUILDING IMMERSED STRUCTURES
AND A DEVICE FOR CARRYING OUT SAID METHOD**

Jean Aubert, 8, rue La Boetie, Paris, France

Filed April 15, 1971, Ser. No. 134,328

Int. Cl. E02b 3/06, 7/00; E02d 27/20, 29/06

U.S. Cl. 61-46

19 Claims

A method and device for the construction of dams or dikes either in rivers or in the sea. A wall of sheet piles is set in position by embedding in the bottom, a row of projecting elements is placed alongside said wall in substantially parallel relation thereto, the space formed between said projecting elements is packed with filling material, a prefabricated raft which is supported on the sheet-pile wall and on the row of elements is set in position underwater on the bottom which has thus been prepared, grout is injected into at least part of the foundation mass, whereupon the raft is anchored relative to the mass.

Keywords: Channel barrier; Grouting; Offshore construction; Pile, sheet; Pile, steel; Seabed foundation

U.S. Cl. X.R. 61-22; 61-25; 61-30; 61-49;
61-50; 61-52



3,720,068

METHOD AND APPARATUS FOR SPLICING REPLACEMENT PILE SECTION TO PILE STUB

Eugene R. De Rosa, 1649 Fernside St.,

Redwood City, Calif. 94061

Filed Apr. 12, 1972, Ser. No. 243,342

Int. Cl. E02d 5/60

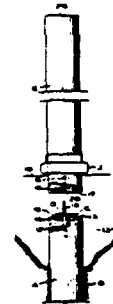
U.S. Cl. 61-53

9 Claims

Method and apparatus for splicing replacement pile section to pile stub, wherein the replacement pile section is moved into axial alignment with respect to the pile stub so that the former will be mounted on the latter, with a waterproof adhesive being placed therebetween to provide a bonded joint. Moreover, a plurality of connector plates are nailed to the replacement pile section and the pile stub to overlap the joint, and layers of waterproof mastic are placed over the connector plates; and then felt, or the like, is disposed over the mastic to protect a resilient tubular boot from damage by the nail heads when the boot is subsequently rolled over the joint.

Keywords: Pile section connection; Pile, wood; Structure repair

U.S. Cl. X.R. 52-585; 61-54; 287-20.92L;
287-127E



283

MARCH 20, 1973

3,721,095
**CONTROLLABLE FORCE METHOD AND SYSTEM OF
DRIVING PILES**

Stephen V. Chelminski, West Redding, Conn., assignor to Bolt Associates, Inc., Norwalk, Conn.

Filed Aug. 23, 1971, Ser. No. 173,917

Int. Cl. E02d 7/02

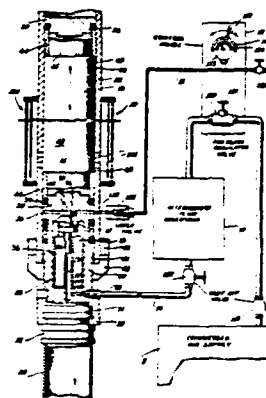
U.S. Cl. 61-53.5

21 Claims

A method and system for determining the magnitude of a driving force being exerted on a substantially rigid object being driven into the earth, such as a pile, and controlling the magnitude in response to that determination. Where the pile driver utilizes a massive piston weight reciprocating in a cylinder and bouncing upon pressurized fluid in a chamber, the force magnitude is determinable by sensing pressure values occurring in the bounce chamber. Force control is obtainable by regulating the flow of pressurized fluid into the bounce chamber in response to the determination. Peak pressure values are sensed by pressure gauge or transducer means to determine the peak values of driving force being exerted on the top of the pile and control of the pile driver operation can be manually or automatically obtained.

Keywords: Pile driver, impact; Pile load measurement

U.S. Cl. X.R. 173-1; 173-2; 173-131; 175-19



3,721,311
**MARINE SEISMIC SOURCE EMPLOYING THE
WATER-HAMMER EFFECT**

Lewis Morton Mott-Smith, Houston, Tex., assignor to Mandrel Industries, Inc., Houston, Tex.

Filed Mar. 11, 1970, Ser. No. 18,418

Int. Cl. G01v 1/14, 1/38

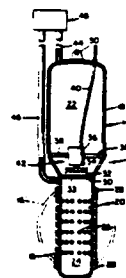
U.S. Cl. 181-5 H

16 Claims

Apparatus for generating a seismic signal in a fluid medium wherein a member such as a flexible diaphragm, inflatable elastic member, piston, etc., is placed in a first or initial position relatively slowly by a pneumatic, hydraulic, electrical, mechanical etc., system, and upon firing is allowed to move rapidly to a second position, where it is abruptly stopped. That is, the member provides for the slow creation of a selected volume within the fluid medium which volume is then allowed to shrink rapidly whereupon its motion is suddenly arrested. The hydrostatic pressure of the fluid medium causes the medium to follow the movement of the member, whereby abruptly stopping the member likewise suddenly stops the fluid movement to generate, in turn, a single high pressure pulse due to the water-hammer effect. Thus, the invention is concerned with generating a single seismic pulse by the more efficient process of suddenly stopping, rather than by suddenly accelerating, a given quantity of the surrounding fluid medium.

Keywords: Seismic implosive acoustic transmitter

U.S. Cl. X.R. 181-5NC



3,721,618

ALUMINUM SACRIFICIAL ANODE

John T. Reding, Lake Jackson, and David W. Barnett, Clute, both of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed March 11, 1971, Ser. No. 123,284

Int. Cl. C23F 13/00

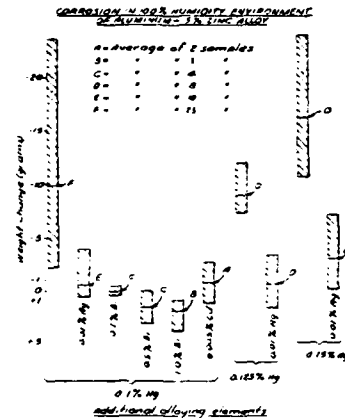
U.S. Cl. 204-197

14 Claims

An aluminum base alloy comprising about 0.01 to about 0.2 weight percent mercury, about 0.1 to about 20 weight percent zinc, and a heavy metal. The heavy metal can be about 0.03 to about 2.0 weight percent bismuth, about 0.001 to about 0.05 weight percent cadmium, and about 0.001 to about 0.04 weight percent silver. Methods of producing the alloy and of using the alloy as a sacrificial anode are described.

Keywords: Cathodic protection; Corrosion prevention

U.S. Cl. X.R. 75-146; 204-148; 204-293



APRIL 3, 1973

3,724,222

MOORING STRUCTURE AND METHOD

Graydon H. Crain, Freedom Road, RD No. 3, Mars, Pa.

Filed June 10, 1971, Ser. No. 151,641

Int. Cl. E02d 13/00; E02b 3/06

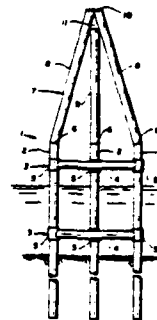
U.S. Cl. 61-46

5 Claims

This invention relates to a mooring structure and method of construction thereof, comprising a triangular template or diaphragm having vertical sleeves at the corners through which tubular legs or piles are driven in telescoping arrangement while the template is supported by beams whose ends are held on two barges straddling the structure. The sleeves are welded to the legs. A prefabricated triangular tripod is welded to the top of the legs. Concrete is then poured into the legs. One or more diaphragms may be used with each structure at a selected height above or below the water level.

Keywords: Offshore construction; Offshore mooring structure; Pile dolphin; Pile, steel

U.S. Cl. X.R. 52-654; 61-48; 114-230



3,724,223
ONE PIECE, DRIVE FIT, CLOSURE CAP AND SLEEVE
FOR PILES

Charles R. Pepe, Old Quarry Road, Apline, N.J.
Filed Nov. 27, 1970, Ser. No. 93,278
Int. Cl. E02d 5/00, 5/72; F16l 25/00

U.S. Cl. 61-53

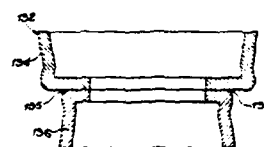
28 Claims

A drive fit, closure cap for pipe piles formed of a pan having tapered upright sides, the tapered sides serving to lead the pipe into the pan and thereby reduce the pipe diameter to a lesser diameter than it originally had, to thus make a nonwelding self locking water tight joint for efficient pile driving. The pan is provided with an internal annular ring which may be utilized to retain gasket and/or sealant material or may be sized to be a drive fit on the inside of the pipe while the tapered sides of the pan form a drive fit on the outside of the pipe.

A drive fit sleeve for joining two pipe piles formed of two such drive fit closure caps joined bottom to bottom and having their bases' centers blanked out.

Keywords: Pile-driving shoe; File section connection; Pile, steel

U.S. Cl. X.R. 61-53.5; 72-1; 138-89;
285-331; 285-398



3,724,553
FLOATING FIRE EXTINGUISHING APPARATUS AND
CATCH BASIN

Randall J. Chiasson, 808 Jefferson St; Ronald G. Bourg, 114
Thorobred Drive, and Tilson J. Arceneaux, 1514 Lynn
Avenue, all of Thibodaux, La.

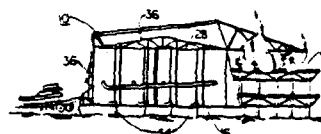
Filed Feb. 29, 1972, Ser. No. 233,384
Int. Cl. A62c 3/00

U.S. Cl. 169-2 R

5 Claims

An enclosing floating structure, having an openable end, and pushable by a tug to enclose a burning offshore oil rig through the openable end which is then closed to smother a fire. Pumps mounted on the structure spray water over the burning rig to assist in putting out a fire and to cool the rig. Interconnected pressure relief vents are provided to relieve internal pressures. The annular space defined by the enclosing floating structure in the water for a depth equal to the draft of said structure provides a catch basin for the containment of liquid hydro-carbon liquids. Provision is made for removing pollutants from the catch basin before its capacity is exceeded or the openable end is opened.

Keywords: Pollutant burning; Pollutant collection; Pollutant removal watercraft; Pollutant, suction removal



3,724,590
**BUBBLE PULSE SUPPRESSION WITH ACOUSTIC
 SOURCE OPTIMIZATION**

William C. Knudsen, 18475 Twin Creeks Road, Nonte Sereao,
 Calif.

Filed May 10, 1971, Ser. No. 141,849

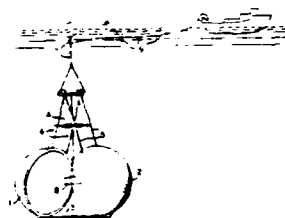
Int. Cl. G01v 1/10, 1/28

U.S. Cl. 181-5 XC

12 Claims

The acoustic wave associated with an underwater gas bubble pulse is optimized by permitting the gas bubble to expand as freely as possible during its initial expansion. After the initial expansion, or primary pulsation, the energy of the oscillatory system in the form potential energy is prevented from being transformed into the kinetic energy of water rushing in to fill a collapsing cavity. The potential energy of the oscillatory system is dissipated gradually to permit the device used to be made ready for the generation of a subsequent gas bubble. The method of the present invention is embodied, for example, in a structure having a surface which is covered with strips of a flexible material whose acoustic properties are close to the acoustic properties of water, e.g. a material for which ρc , the product of the density of the material times the speed at which sound travels in the material, is close to the ρc of water. The material is attached to the structure at selected points on the surface thereof. When a gas bubble is generated as a result of the creation of an acoustic wave, the acoustic wave is transmitted through the material and into the surrounding water without significant reflection or alteration. As the bubble expands, the water forced ahead of the expanding bubble is allowed to flow through the structure by the flexing of the covering material at the locations at which the material is not attached to the mesh structure. When the gas bubble has reached its maximum radius and the water surrounding the perimeter of the bubble begins to rush in to fill the cavity of the bubble, the covering material which has flexed to allow the water to flow out of the structure is forced into place around the exterior of the structure by the pressure of the water filling the bubble cavity. The covering material prevents water from rapidly filling the cavity so that the oscillation of the bubble is essentially stopped. The surface of the material may contain perforations to permit water to gradually return into the cavity to provide a reasonably short recycling period of the acoustic wave generation device.

Keywords: Seismic explosive acoustic transmitter



3,724,662
**CONTROL OF OIL POLLUTION AT SEA, APPARATUS
 AND METHOD**

Angel J. Ortiz, Calle Rio Guadalquivir No. 30, Mexico City,
 Mexico

Filed March 12, 1971, Ser. No. 123,779

Int. Cl. B01d 21/00

U.S. Cl. 210-83

26 Claims

Massive oil spills from tankers or offshore wells and small spills from bottom crevices are eliminated by confining the oil right at the spill source, before it becomes a slick, by means of a marine pollution control system which includes a huge plastic bag from which oil is pumped from the bag to a receiving facility. The marine pollution control system, also referred to as <MPCS>, is a preventive and contingency constituting a complete, self-contained, light and mobile system of men and equipment that can be deployed on very short notice for oil spill containment anywhere in the world.

Keywords: Pollutant, submerged barrier;
 Pollutant, suction removal

U.S. Cl. X.R. 210-242



AD-A080 796

COASTAL ENGINEERING RESEARCH CENTER FORT BELVOIR VA
AN ANNOTATED BIBLIOGRAPHY OF PATENTS RELATED TO COASTAL ENGINE--ETC(U)
NOV 79 R E RAY, M D DICKEY, A M LYLES
CERC-WR-79-6-VOL-8-APP

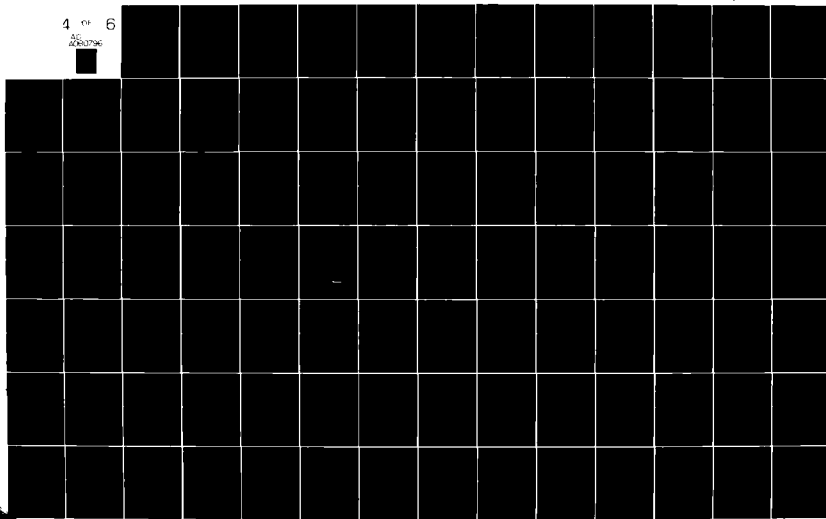
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UNCLASSIFIED

NL

4 of 6

AD-A080 796



APRIL 10, 1973

3,726,098

MODULAR DOCK FLOAT

Erhard E. Alma, Barrington, and James E. Mitchell, Cary,
both of Ill., assignors to AFE Industries, Inc., Lake Zurich,
Ill.

Filed March 30, 1970, Ser. No. 23,688

Int. Cl. E02b 3/06, 3/20

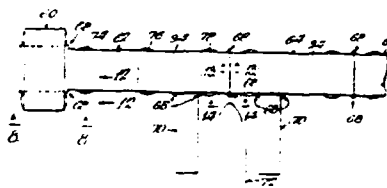
U.S. Cl. 61-48

6 Claims

A floating structure supported in water by floating pontoons and having a flat deck which can be used as a swim float and a plurality of floating dock sections interconnected to provide a floating dock are disclosed. The dock sections are interconnected by mating connectors having openings therethrough which slidably receive an elongated vertical rod secured to the bottom of a body of water on which the dock is floating. A rod-mating connector pair at each corner of a dock section prevents tipping of the dock section by unbalanced loads or the like while allowing for vertical motion of the dock.

Keywords: Pier, floating; Small-craft pier

U.S. Cl. X.R. 94-27; 114-0.5F



3,726,406

OIL SKIMMING APPARATUS

Clifford Damberger, P.O. Box 361, Taber, Alberta, Canada
Filed Feb. 9, 1971, Ser. No. 113,890

Int. Cl. E02b 15/04

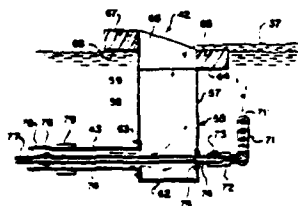
U.S. Cl. 210-242

6 Claims

A skimmer body is provided with front and rear faces and with floatable members connected to the upper portions of the front and rear faces with the front floatable members being lower than the rear floatable member, the floatable members being of such capacity as to support the skimmer body with the upper surface of the front floatable member underlying the oil slick to be collected. Extending from the forward face and laterally of the skimmer body is a hot water spray heat to heat the oil slick from beneath the same just immediately to its passing over the upper surface of the front floating body. End plates confine the oil slick to the opening in the top of the skimmer body and prevent the lateral escape of the same therefrom. The oil slick is drawn into the oil skimmer body by a cable water fence gathered by boat equipment and drawn toward the skimmer body. A heater and separator and a vacuum pump that removes the oil slick from the skimmer body and a hot water pump line takes the water from the separator and delivers it to the hot water spray head on the skimmer body. The oil is delivered from the heater and separator to an oil tanker or other storage device that may be available. The oil water fence is made up of a series of floatable blocks having end plates that can be connected together by a pin and pin opening arrangement and held thereagainst by a pin locker device extending downwardly from the top surfaces of the blocks.

Keywords: Pollutant collection; Pollutant, suction removal; Pollutant, surface barrier

U.S. Cl. X.R. 210-DIG.21



3,726,779
MARINE ANTICORROSION ANODE STRUCTURE
 John A. Morgan, 6037 Dunrobin Ave.,
 Lakewood, Calif. 90713
 Filed Jan. 11, 1971, Ser. No. 105,302
 Int. Cl. C23f 13/00

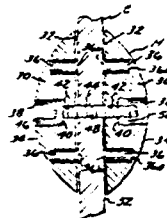
U.S. Cl. 204—197

1 Claim

An anticorrosion anode structure for protecting iron or steel portions of a boat that are subject to corrosion when immersed in water, which device includes at least one body of a metal that has a greater electrolytic solution tendency than iron. The body has a number of spaced copper electrodes embedded therein and extending therefrom.

Clamping means are provided to force the free ends of the copper electrodes into pressure contact with the metallic structure to be protected, with the copper serving the dual purpose of forming an electrical connection in a galvanic cell that is defined by the metal body and the surface to be protected, as well as so spacing the body from the surface that substantially the entire external area of the body is in contact with the water in which it is immersed. The body by the electrical potential between it and the surface to be protected prevents corrosion of the surface.

Keywords: Cathodic protection; Corrosion prevention



3,726,950
METHOD FOR PRODUCING SUB-AQUEOUS AND OTHER CAST-IN-PLACE CONCRETE STRUCTURES IN SITU
 Lee A. Turzillo, 2078 Glengary Road, Akron, Ohio
 Continuation-in-part of Ser. No. 647,026, June 19, 1967, abandoned. This application Jan. 2, 1970, Ser. No. 44
 Int. Cl. E04b 1/32, 1/36

U.S. Cl. 264—32

33 Claims

Method for repairing or forming structural bodies of self-hardening fluid cement mortar, in a sub-aqueous or other situs, utilizing body-forming cavity including body-shaping walls of porous fabric in combination with openwork matrix means. Fluid mortar or like cementitious material pumped into cavity to fill same and expand fabric walls against tensional restraint of fixedly maintained matrix means. Pressure of fluid material continued against restraint of matrix means until small proportions of fluid material oozes into the porous fabric, and indicates attainment of lowered water-cement ratio in formed body, and then fluid material is allowed to set and harden in said given formed shape.

Some, if not all, forms of the invention are particularly useful for under-water installations, such as breakwaters because forming matrices thereof are capable of withstanding rough seas or storm waves without damage during the construction processes, and because the fluid cement mortar pumping operations are possible in minimum of time when rough water conditions subside.

Keywords: Breakwater, concrete; Bulkhead; Concrete form; Fabric mat; Offshore construction; Pile, concrete; Structure repair

U.S. Cl. X.R. 52-310; 52-744; 61-35; 249-12; 249-19; 264-34; 264-36; 264-86; 264-256; 264-333



3,727,178
ECHO SOUNDING DISTANCE MEASUREMENT METHOD
AND APPARATUS

Wolfgang Stednitz, Neukrug, Germany, assignor to Fried.
Krupp Gesellschaft mit beschränkter Haftung, Essen, Ger-
many

Filed Sept. 8, 1971, Ser. No. 178,658

Claims priority, application Germany, Sept. 12, 1970,
P 20 45 276.0

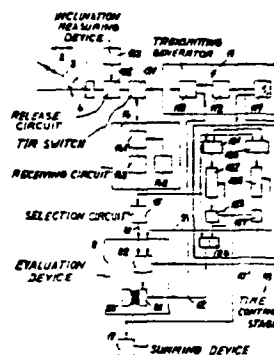
Int. Cl. G01s 9/68

U.S. Cl. 340-3 R

18 Claims

A method and apparatus for measuring the length of the component in a predetermined direction of a distance to a point through a sound transmitting medium by radiating a narrow beam of sound energy from an electroacoustic transducer array of the type which produces a beam whose angular direction is a function of the frequency of the excitation signals applied thereto, directing the beam toward the point at a predetermined angle to the component direction and providing a length indication based on a combined function of the elapsed time between transmission of the beam and reception of its reflected version and the frequency of the signals supplied to the transducer array.

Keywords: Sonar, depth sounder



APRIL 17, 1973

3,727,248
BUOY WITH ADJUSTMENTS FOR THE REDUCTION OF
THE EFFECT OF THE SEA FORCES THEREON

Hartmut H. O. Schulze, Hamburg, Germany, assignor to
Hagenuk vormals Neufeldt & Kuhnke GmbH, Kiel, Germany

Filed July 7, 1970, Ser. No. 52,844

Claims priority, application Germany, July 18, 1969, P 19
36 558.3

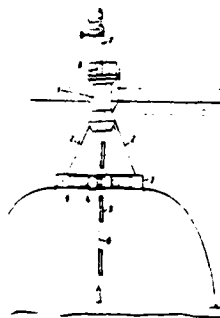
Int. Cl. B63b 21/00

U.S. Cl. 9-6 R

5 Claims

A buoy specifically constructed for reducing the effect of wave and sea forces thereon. The horizontal diameter of the buoy at the surface of the water is relatively small, with the largest, stabilizing part of the displacement volume of the lower part of the buoy being at a water depth in which the amplitude of the vertical oscillations of the water is smaller than the amplitude movement of the buoy. The stabilizing part of the buoy comprises elongated bodies having an essentially horizontal longitudinal axis.

Keywords: Buoy, instrumented



3,727,411

INFLUENCING SEDIMENTATION

Paul Cephus Rhodes, Harrigate, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Nov. 6, 1970, Ser. No. 87,420

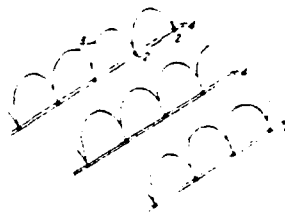
Int. Cl. E02b 3/04

U.S. Cl. 61-3

7 Claims

Means for influencing the sedimentation and movement of solid particles of material in seas, lakes and other bodies of water comprising an array of threads, tapes or filaments attached in loops to anchoring means.

Keywords: Artificial seaweed; Low-cost shore protection



3,727,414

OFF SHORE DRILLING PLATFORM CONSTRUCTION

Philip Davies, Calgary, Alberta, Canada, assignor to Peter Bowden Drilling Services Ltd., Calgary, Alberta, Canada

Filed June 28, 1971, Ser. No. 157,545

Int. Cl. E02b 17/00, B63b 35/44

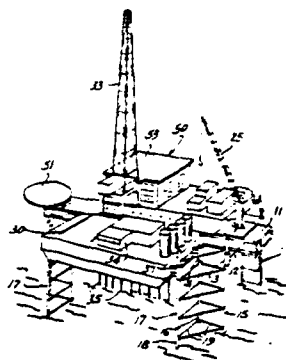
U.S. Cl. 61-46.5

7 Claims

Four legs or spuds engaging the sea bed support an elevated, elongated platform above the water to form an I configuration defining a pair of barge-receiving slots into which different barges can be moved and raised to the platform level by jacking mechanisms. The arrangement permits "unit chassis" type operation by which first a drilling barge with a derrick can be introduced and then, after drilling, this barge can be removed and the slot occupied by a production barge, leaving a servicing slot vacant for future work.

Keywords: Offshore platform, jack up

U.S. Cl. X.R. 61-48; 114-.5D



3,727,415

BOAT DRY DOCKING DEVICE

Barney V. Williams, Route No. 1, Grove, Okla.

Filed Sept. 16, 1971, Ser. No. 180,976

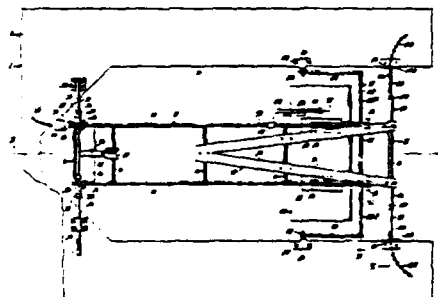
Int. Cl. B63c 1/00

U.S. Cl. 61-65

7 Claims

A boat dry docking device for small craft consisting of an elongated boat supporting frame adapted to be disposed longitudinally in the boat well of a floating dock and to be pivoted to said dock at the closed end of said well for vertical movement, whereby the end thereof at the open end of the well may be dropped below water level, to receive a boat thereon, or raised to elevate said boat above water level, a flotation tank open at its bottom secured to the frame remotely from its pivot, mechanism operable to deliver air to or exhaust it from the tank whereby to raise or lower the frame, and reinforcing devices for preventing lateral tilting and lateral sideway of the free end of the frame.

Keywords: Small-craft service structure



3,727,766
**VACUUM SKIMMING APPARATUS FOR REMOVING
 LIQUID CONTAMINANTS FLOATING IN CONFINED
 BODIES OF WATER**

Don M. Horne, 5300 Swarthmore St., La Mesa, Calif.; William
 H. Heyser, 1408 Sunnyland Avenue, El Cajon, Calif.; and
 Herman M. Neely, 934 W. Michelle St., West Covina, Calif.
 Filed May 18, 1971, Ser. No. 144,500
 Int. Cl. E02b 15/04

U.S. Cl. 210-242

1 Claim

A boat-mounted vacuum system for removing floating liquid contaminants, such as oil spills, particularly from confined bodies of waters such as harbors, bays, and the like. The system employs one or more water jet ejectors for creating a vacuum in a vacuum tank located between the suction heads and the pump supplying high pressure water to the ejectors so that the pump does not lose its prime when the suction heads are lifted off the water surface from which it is collecting the contaminants.

Keywords: Pollutant removal watercraft;
 Pollutant, suction removal

U.S. Cl. X.R. 210-DIG.21



3,728,549
IN SITU DEVICE FOR MEASURING LIGHT SCATTERING
 Peter L. Sachs, Falmouth, Mass., assignor to The United States
 of America as represented by the Secretary of the Navy
 Filed April 12, 1972, Ser. No. 243,140
 Int. Cl. G01a 21/26

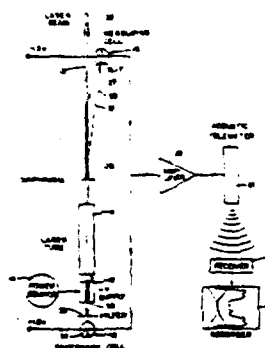
U.S. Cl. 250-218

7 Claims

A self-contained, telemetering, fixed small angle forward scatterance meter for furnishing real-time data on light scattering intensity is provided. Collimated light from a laser is directed through the water, scattered light reaching a photosensitive surface which is offset from the axis of the laser beam a selected short distance. Variations in ambient temperature and laser intensity are compensated for by a reference photocell which is matched to the measuring cell. Data representative of light scattering is continuously telemetered and received and recorded at a remote location. This data provides a continuous profile of readings related to the concentration of matter in suspension as determined by gravimetric analysis of samples collected while the device is disposed in the medium.

Keywords: Instrument, laser; Pollutant
 measurement; Sampler, suspended
 sediment

U.S. Cl. X.R. 179-1UW; 250-210; 340-4R



3,728,622

METHOD OF AND APPARATUS FOR MEASURING IN SITU THE FORMATION FACTOR

Cecil E. Williams, 2753 Peter St., Honolulu, Hawaii

Filed Sept. 28, 1971, Ser. No. 184,446

Int. Cl. G01v 3/06

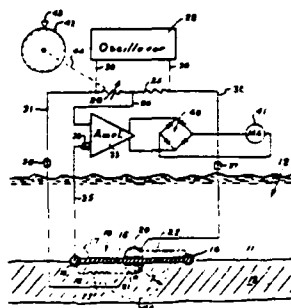
U.S. Cl. 324-9

13 Claims

A method of and apparatus for measuring in situ the formation factor is disclosed. The formation factor is the ratio of the resistivity of a water saturated sediment to the resistivity of the interstitial water of the sediment. To this end the sediment is insulated from the water by an insulating sheet provided with a circumferential electrode and two opposed electrodes disposed on opposite surfaces of the sheet. By applying an alternating current between these three electrodes the ratio of the resistivity between the electrode in contact with the sediment and the circumferential or counter electrode on the one hand and the resistivity between the opposed electrode in contact with the water and the counter electrode may be measured. This may conveniently be effected by a Wheatstone bridge to which an alternating current is applied. The bridge may be balanced by adjusting one of the resistors thereby to measure the ratio of the resistance of the sediment to the resistance of the water. The electrode arrangement may be modified to form in essence a sled which may be moved by a boat or a ship across the water-sediment interface.

Keywords: Instrument deployment; Instrument, seabed in situ; Instrument, towed; Seabed property measurement

U.S. Cl. X.R. 324-62



3,728,671

MULTIPLE-ELECTRODE, DIRECTIONAL, ACOUSTIC SOURCE

Adolph M. Poston, Jr., Petaluma, Calif., assignor to The United States of America as represented by the Secretary of the Interior

Filed April 30, 1970, Ser. No. 33,453

Int. Cl. G01v 1/00

U.S. Cl. 340-12 SD

1 Claim

Concentric electrode pairs of opposite polarity improve the efficiency of a spark-gap acoustic source for marine seismic profiling. One electrode of a pair is tubular; the other is rod-like and positioned axially within the tubular electrode. Among the benefits resulting from the concentric electrode configuration are constant output, directional control, high frequency, efficiency, and a high repetition rate.

Keywords: Seismic explosive acoustic transmitter

U.S. Cl. X.R. 181-.5EM; 181-.5XC



APRIL 24, 1973

3,728,748

MOORING APPARATUS

Frederick G. Roehler, II, Oxnard, Calif., assignor to The United States of America as represented by the Secretary of the Navy

Filed Nov. 27, 1970, Ser. No. 93,318

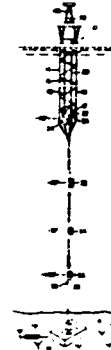
Int. Cl. B63b 21/52

Keywords: Buoy, instrumented; Buoy mooring system

U.S. Cl. 9—8 R

1 Claim

A tethering arrangement for a water-borne object which is effective to absorb forces tending to cause positional displacements thereof and subsequently utilize the energy so absorbed to return the object to its original location. In a preferred embodiment, one or more elongate members each having a predetermined elasticity factor connecting the floating object to a fixed sub-surface point or structure, the overall length of each such member varying in accordance with the stresses imposed thereon by virtue of weather conditions and/or other environmental factors to which the floating object may be subjected. In addition, the constant flexing of the elastic members greatly inhibits the growth of marine organisms on the surface thereof, as well as eliminating the cyclic stress which leads to the failure of steel components due to work-hardening



3,728,864

APPARATUS FOR REPAIRING STEEL SUPPORTING PILES

George C. Wiswell, Jr., 1014 Pequot Road, Southport, Conn.
Filed March 4, 1971, Ser. No. 121,005

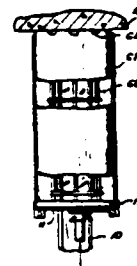
Int. Cl. E02d 5/60, 15/04

Keywords: Concrete form; Pile, steel; Structure repair

U.S. Cl. 61—54

5 Claims

A cylindrical form is positioned around that portion of a steel pile which is to be repaired and the lower end of the form closed by a bottom plate having an opening therethrough closely conforming to the configuration of the pile. The bottom plate is provided with a nipple to which a hose is detachably connected through which concrete is pumped. Set-screws in the nipple are threaded into a groove on the hose insert to hold the insert into position. The bottom plate is released from the concrete by means of a plurality of bolts threaded into nuts secured on the bottom plate so that threading the bolts inwardly causes the bolt ends to push against the concrete and release the bottom plate therefrom.



U.S. Cl. X.R. 25-41; 25-104.5; 61-63

3,729,411

METHOD OF REMOVING OIL FROM WATER

Joseph V. Otrhalek, Dearborn, Mich., assignor to BASF Wyandotte Corporation, Wyandotte, Mich.

No Drawing. Filed Feb. 16, 1971, Ser. No. 115,879

Int. Cl. E02b 15/04

U.S. Cl. 210—36

3 Claims

Oil slicks and other oil films are removed from bodies of water by casting onto the water a silicone-treated expanded volcanic ash containing, optionally, a thickening agent, and, thereafter, removing the oil absorbed composition from the water.

Keywords: Pollutant absorption

U.S. Cl. X.R. 210-DIG.21; 210-40; 252-378

No Figure

MAY 1, 1973

3,729,755

IMPROVEMENTS RELATING TO RELEASE MECHANISM FOR BUOYS

Peter Ronald Cochrane, Springfield, Pa., assignor to Emi Limited, Hayes, Middlesex, England

Filed Sept. 8, 1970, Ser. No. 69,655

Claims priority, application: Great Britain, Sept. 10, 1969, 44,725/69

Int. Cl. B63b 21/52

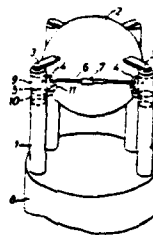
U.S. Cl. 9—8 R

1 Claim

A buoy comprising a sinker, a sub-surface float and a surface float is dropped into the water as a single unit. The sinker is released by means which are not described, the invention being concerned with the means for securing and releasing the surface float. Four longerons are rigidly secured to the sub-surface float and have openings near their free ends. Attached to the surface float are four brackets each carrying a pivotable member whose ends are located in the openings of a respective longeron. The pivotable members are secured by a wire which passes around the surface float and engages each of the pivotable members, the ends of the wire being joined together by a timed release mechanism which after a predetermined time releases the ends of the wire and thus releases all the pivotable members simultaneously.

Keywords: Buoy, instrumented; Buoy mooring system; Instrument deployment

U.S. Cl. X.R. 244-1R



3,729,855
**APPARATUS FOR SEQUENTIALLY DEPLOYING
 SPECIMEN COLLECTORS AT SELECTED DEPTHS IN A
 BODY OF WATER**

Shale J. Niskin, 9400 S. W. 63 Court, Miami, Fla.
 Filed Dec. 9, 1971, Ser. No. 206,365
 Int. Cl. A01k 73/02

U.S. Cl. 43-8

6 Claims

An oceanographic apparatus adapted to be submerged from a craft in a body of water by an end weighted cable for retaining a plurality of compacted specimen collectors for sequential release by remote electric control from the surface craft to descend along the cable to a plurality of predetermined distances for electric deployment for each specimen collector at a predetermined depth when the cable and collectors are towed by a craft or held in a current including automatic means for closing each collector to retain collected specimens therein prior to retraction to the surface by the cable.

Keywords: Instrument deployment; Instrument-towed; Sampler, biota

U.S. Cl. X.R. 43-9



3,729,940
OFFSHORE TOWER

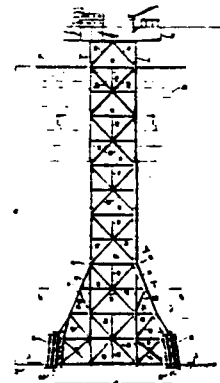
Albert M. Koehler, Houston, Tex., assignor to Brown & Root, Inc., Houston, Tex.
 Division of Ser. No. 13,122, Feb. 20, 1970, Pat. No. 3,585,801.
 This application March 5, 1971, Ser. No. 121,464
 Int. Cl. E02b 17/00; E21b 40/00

U.S. Cl. 61-46.5

10 Claims

A tower suitable for use in offshore well operations and the like and including a plurality of generally vertical columns extending from the bed of a body of water to a position above the surface of the body of water for supporting a platform thereupon. A quaternary batter brace system is connected to the generally vertical columns in a position intermediate the ends of the columns and beneath the surface of the body of water. Piling jacket clusters are connected to the free end of each of the batter brace members and are designed to rest upon the bed of the body of water. A plurality of piles extend through the batter piling jacket clusters and pin the offshore tower to the bed of the body of water. A reinforcing lattice connects adjacent batter brace members and pile jacket clusters solely on opposite sides of the vertical columns. The region between alternate batter braces and pile jacket clusters on opposite sides of the vertical columns are free of inner connecting reinforcing structure.

Keywords: Offshore construction; Offshore platform, fixed; Seabed foundation



3,729,942

RAPID CONSOLIDATION OF FLUIDIZED SAND BED

Johannes Van Steveninck, Rijswijk, Netherlands, assignor to Shell Oil Company, New York, N.Y.

Filed July 23, 1971, Ser. No. 165,602

Claims priority, application Great Britain, Aug. 21, 1970, 40,451/70

Int. Cl. F16I 1/00; E02f 5/02

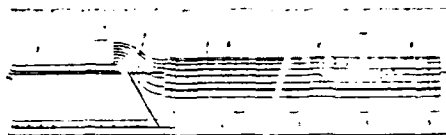
U.S. Cl. 61-72.4

7 Claims

Method and apparatus for obtaining rapid consolidation of the fluidized sand mass on top of a submarine pipeline buried in the bottom of a body of water by fluidization of the bottom. Rapid consolidation is obtained by reducing the flow rate of the water injected into the bottom to about a third of the minimum flow rate necessary for fluidization of the bottom.

Keywords: Seabed pipeline placement;
Seabed soil treatment

U.S. Cl. X.R. 61-35; 61-63



3,730,119

FLOATING DEBRIS RECOVERY BASKET

Allan R. Budria, Nutley, and Tadeusz A. Tokarczyk, Mount Arlington, both of N.J., assignors to Worthington Corporation, Harrison, N.J.

Filed Jan. 6, 1971, Ser. No. 104,350

Int. Cl. B63b 35/32

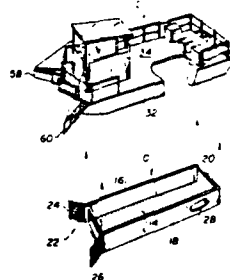
U.S. Cl. 114-.5 R

12 Claims

A floating debris recovery basket is disclosed which is particularly useful in combination with a highly maneuverable catamaran type vessel. The basket is removably secured to the vessel and located between the twin hulls thereof. When the container-like basket is filled with debris, the vessel backs away from the basket leaving it floating for subsequent removal. Floatation of the basket is preferably accomplished by filling hollow side walls thereof with buoyant material.

Keywords: Pollutant debris; Pollutant
removal watercraft

U.S. Cl. X.R. 210-242



3,730,278

SAFETY ENCLOSURE FOR OFF-SHORE OIL RIGS

Lawrence F. Foy, 27 Rambler Road, Southampton, Pa.

Filed Feb. 17, 1972, Ser. No. 227,053

Int. Cl. A62c 3/00

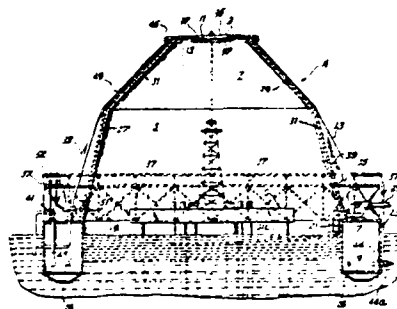
U.S. Cl. 169-2 R

16 Claims

The floatable safety enclosure is formed by a plurality of upwardly extending, floatable wall sections which are adapted to be floated into position around an off-shore oil or gas well platform and secured together to form a continuous, dome-like wall around the platform.

Keywords: Pollutant burning; Pollutant collection; Pollutant, suction removal; Pollutant, surface barrier

U.S. Cl. X.R. 166-.5; 166-75; 175-9



3,730,289

SEISMOGRAPHIC DEVICE

Philip Barnhard, IV, 1062 Dunvegan Drive, West Chester, Pa.

Filed Sept. 18, 1970, Ser. No. 73,436

Int. Cl. G01v 1/06

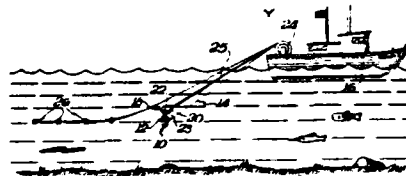
U.S. Cl. 181-0.5 NC

14 Claims

An underwater seismographic device for surveying or prospecting without the use of bubble formation comprises a vessel having a constricted orifice with an area of about 5 percent to about 20 percent of the maximum cross-sectional area of the vessel. The combustion gases escape through the orifice and the shock wave used for seismographic prospecting passes through the wall of the vessel.

Keywords: Seismic explosive acoustic transmitter

U.S. Cl. X.R. 181-0:5XC; 340-8R



3,730,346
SKIMMING SYSTEM

Cecil H. Prewitt, Olympia, Wash., assignor to Cortland Skinner; Cecil K. Glaze and Cecil H. Prewitt, all of Olympia, Wash.

Filed March 1, 1971, Ser. No. 122,600
Int. Cl. E02b 15/04

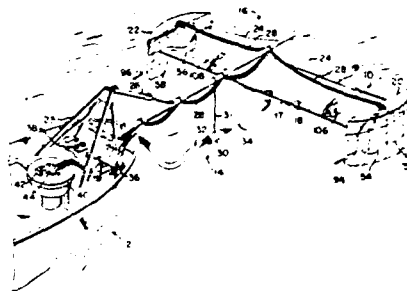
U.S. Cl. 210-242

7 Claims

A system for skimming floating fluids, such as oil and small pumpable debris, from the surface of a body of water includes an elongated sink-like or trough-like skimming unit adapted to be propelled through the water, with means for drawing fluid from the unit and conducting it to a separator for separating the floatable matter from the water. The elongated skimming unit extends laterally of the path along which the unit is propelled through the water and adjustable flotation means are included for controlling the vertical and angular position of the unit in the water. The skimming unit has forward and aft edges lying in the same horizontal plane and maintained at substantially the same height in the water to prevent creation of a bow wave pushing the oil away from the unit and to permit the oil or other floatable fluid to be drawn into the trough across both the forward and aft edges. Flotation and propulsion adjustment means maintain the optimum position of the unit in the water during use.

Keywords: Pollutant collection; Pollutant debris; Pollutant, suction removal

U.S. Cl. X.R. 210-DIG.21



3,731,187
TEMPERATURE COMPENSATED FOULING
MEASURING METHOD AND APPARATUS

Rudolf H. Hausler, Rolling Meadows, and Robert W. Sampson, Arlington, both of Ill., assignors to Universal Oil Company, Des Plaines, Ill.

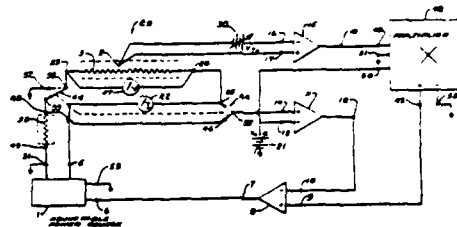
Filed Oct. 6, 1971, Ser. No. 186,888
Int. Cl. G01r 27/02

U.S. Cl. 324-65 R

6 Claims

An apparatus and method for measuring material buildup or fouling on a test specimen in which at least a portion of a temperature sensitive voltage output means is located proximate to a test specimen. The extent of fouling is determined by the change in current value or voltage value resulting from the change in the heat transfer coefficient of the test specimen. The temperature sensitive voltage output means is at the same temperature as the temperature of the medium in which the test specimen resides and adjusts either the current value or voltage value to negate the effects of varying temperature of the medium on the other value across the test specimen.

Keywords: Fouling prevention



MAY 8, 1973

3,731,491

OIL CONTAINMENT BOOM

Arthur L. Markel, and J. Robert R. Harter, both of Miami, Fla., assignors to Reynolds Submarine Services Corporation, Miami, Fla.

Filed Oct. 12, 1971, Ser. No. 188,324

Int. Cl. E02b 15/04

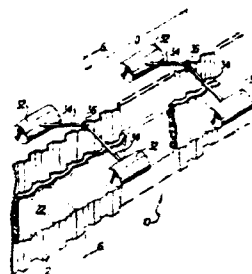
U.S. Cl. 61-1 F

1 Claim

An oil containment boom comprising an elongated strip of corrugated metal which is formed from a plurality of sections secured together end-to-end. The corrugated metal is disposed substantially vertically in a body of water and floated therein with suitable flotation means. In one form of the invention, the flotation means comprises a strip of plastic material adhesively secured to the corrugated metal. In another form of the invention, the previously described flotation means is supplemented with the aid of outrigger or stabilizer floats which extend generally laterally outwardly from the corrugated metal strip. Weights may be attached to the corrugated metal strip to vary the freeboard height of the floating boom.

Keywords: Pollutant, surface barrier

U.S. Cl. X.R. 61-5



3,731,646

EXPLOSIVE EMBEDMENT ANCHOR PROJECTILE

Henry C. Mayo, Fairfax County, Va., assignor to The United States of America as represented by the Secretary of the Army

Filed Aug. 6, 1970, Ser. No. 61,567

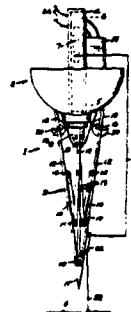
Int. Cl. B63b 21/28

U.S. Cl. 114-206 A

5 Claims

An explosive embedment anchor for use in all types of ocean bottom sediments except consolidated rock. The anchor forms the projectile which is fitted to the gun barrel. The assembly is lowered to the ocean floor and a charge in the gun is detonated by contact therewith to drive the anchor into the sediment. The anchor is provided with a pair of hinged flukes having keying flaps on their upper edges and riser cables. Holding power is achieved by an upward pull on the riser cables causing the keying flaps to wedge against the wall of the crater formed by the anchor's entry and the flukes open to provide maximum pullout resistance.

Keywords: Embedment anchor



3,731,761
**FLOATING PIER WITH SELF ADJUSTING STAIRWAY
 ASSEMBLY**
 Raymond D. Glenn, P.O. Box 6, Cropwell, Ala.
 Filed Aug. 19, 1971, Ser. No. 173,062
 Int. Cl. E06c 1/38

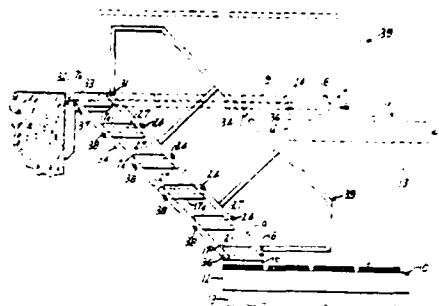
U.S. Cl. 182-1

1 Claim

A buoyant pier is pivotally connected to the lower ends of laterally spaced, elongated, rigid support members with the other ends of the rigid support members pivotally connected to a supporting structure. Longitudinally spaced, parallel stair members extend horizontally between and are pivotally connected to the rigid support members. Other elongated support members extend between and are pivotally connected to the pier and the supporting structure to support and retain the stair members in parallel relationship as the pier moves to various elevations.

Keywords: Pier, floating; Small-craft service structure

U.S. Cl. X.R. 182-97



3,731,813
FLOATING DEBRIS RECOVERY APPARATUS
 Robert R. Tipton, 249 El Caminito, Livermore, Calif.
 Filed May 17, 1971, Ser. No. 143,910
 Int. Cl. C02b 9/02

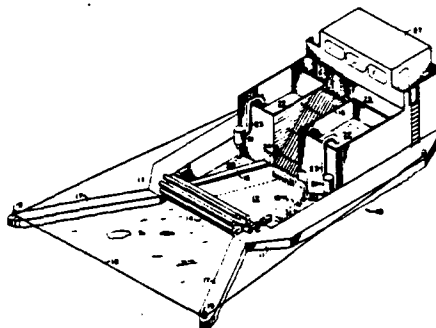
U.S. Cl. 210-242

9 Claims

A marine vessel is equipped with a holding basin into which floating pollutants are urged by a rotating skimmer with a floating wiper along the edge of the basin used to separate the floating liquid debris from the surface of the water and allow it to flow into a collection tank. A conveyor is used to remove the solid debris from the holding basin.

Keywords: Pollutant debris; Pollutant, mechanical removal; Pollutant removal watercraft; Pollutant, suction removal

U.S. Cl. X.R. 210-DIG.21



3,732,161
**METHOD FOR REMOVING OIL AND DEBRIS
 FROM WATER**
 James F. Grutsch, Hammond, and Russell C. Mallatt,
 Crown Point, Ind., assignors to Standard Oil Company,
 Chicago, Ill.
 Original application Mar. 18, 1970, Ser. No. 20,508.
 Divided and this application Jan. 22, 1971, Ser.
 No. 108,939

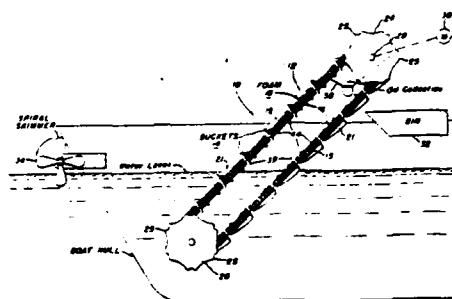
Keywords: Pollutant absorption; Pollutant
 debris; Pollutant, mechanical
 removal

U.S. Cl. X.R. 210-40; 210-DIG.21

Int. Cl. E02b 15/04
 U.S. Cl. 210-30

4 Claims

Oil, solid particles such as biological slime and floating debris, etc., are removed from water by an apparatus including endless chain means made up of a series of interconnected foraminous chambers holding a regenerable porous filter material such as polyurethane. Preferably, the filter material has an outer large pore section and an inner small pore section. A plurality of buckets are attached to the chain means and, as the chain means moves through a closed loop path, these buckets catch debris and dump it into a holding bin. Simultaneously, the filter material absorbs surface and subsurface oil and the like from water traveling through the filter material. The filter material is regenerated by squeezing the filter material to release the oil.



3,732,162
**METHOD OF REMOVING OIL SPILLS
 FROM WATER**
 Frederic C. McCoy, Beacon, Howard V. Hess, Glenham,
 and Rodney L. Sung, Fishkill, N.Y., assignors to Texaco
 Inc., New York, N.Y.
 No Drawing. Continuation-in-part of application Ser. No.
 25,588, Apr. 3, 1970. This application July 6, 1971,
 Ser. No. 160,193

Keywords: Pollutant absorption

U.S. Cl. X.R. 210-DIG.21

Int. Cl. C02b 9/02
 U.S. Cl. 210-40

7 Claims

Oil spills are removed from the surface of a body of water by contacting the oil with a coagulating amount of a coagulant such as asphalt and mixtures of wax or asphalt with anti-caking agents. Enough coagulant is used to form a floating, semi-solid mass with the oil. The coagulant may be used in finely divided form or in a molten state.

No Figure

MAY 15, 1973

3,732,700

UNDERWATER PIPELINE AND CABLE TRENCHING
APPARATUS

Robert P. Lynch, 5606 Farmwood Court, Alexandria, Va.

Filed Aug. 19, 1971, Ser. No. 173,161

Int. Cl. E02f 5/08, 16/1

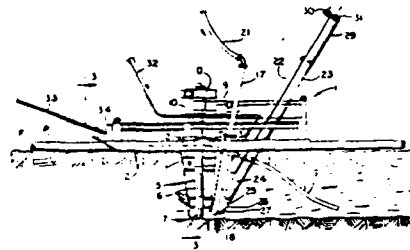
U.S. Cl. 61-72.4

14 Claims

Keywords: Seabed pipeline placement;
Seabed trencher

U.S. Cl. X.R. 37-61; 37-65

An underwater trenching apparatus includes a bottom-riding frame assembly provided with a rotary cutter member carried thereby. A plurality of vertical and horizontal rollers support and guide a pipeline above and adjacent to the cutting elements of the cutter member during advancement to the apparatus. Movable means are included to permit displacement of at least one of said rollers to allow lateral insertion or removal of the pipeline from within the confines of the plurality of rollers after the frame assembly is disposed upon the ocean floor in a straddling manner over the pipeline.



3,732,701

UNDERWATER PIPELINE TRENCHING APPARATUS

Robert P. Lynch, 5606 Farmwood Court, Alexandria, Va.

Filed Aug. 19, 1971, Ser. No. 173,160

Int. Cl. E02f 5/02, 1/00

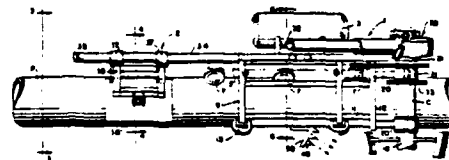
U.S. Cl. 61-72.4

11 Claims

Keywords: Dredge, cutterhead; Dredge intake;
Seabed pipeline placement; Seabed
trencher

U.S. Cl. X.R. 37-65; 254-105

A pipeline trenching apparatus includes a carriage adapted to travel along the periphery of the pipeline. Rotary cutter drums advance with the carriage and are mounted upon frame elements pivotally attached to the carriage. Advancement of the apparatus is achieved by a reciprocating propulsion section connected to the carriage and provided with clamping elements alternately engaging and releasing the pipeline as the propulsion section is extended and retracted.



3,732,841

EXPLOSIVELY EMBEDDED ANCHOR

Henry C. Mayo, Fairfax, Va., assignor to The United States of America as represented by the Secretary of the Army
Filed Mar. 26, 1971, Ser. No. 128,299
Int. Cl. B63b 21/28

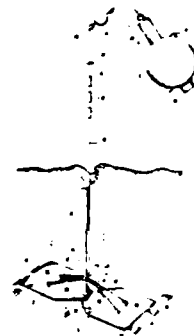
U.S. Cl. 114—206 A

2 Claims

The disclosed invention is an explosively embedded anchor assembly for use in all types of ocean bottom and in all water depths. The anchor assembly has a shaped charge explosive for producing a hole in a rock ocean floor, a projectile anchor for embedding in all ocean floors, and a projectile gun for explosively embedding the anchor. The assembly is provided with bottom-contact detonating means which permits automatic firing of the shaped charge and the anchor, and with a buoyant reaction vessel affixed to the projectile gun to permit automatic recovery of the gun.

Keywords: Embedment anchor

U.S. Cl. X.R. 52-155



3,733,582

DIGITAL DEPTH SOUNDER

Calvert F. Eck, Osterville, and Howard H. Hill, Pocasset, both of Mass., assignors to Datamarine International, Inc., Pocasset, Mass.

Filed Feb. 25, 1971, Ser. No. 118,731
Int. Cl. G01s 9/68

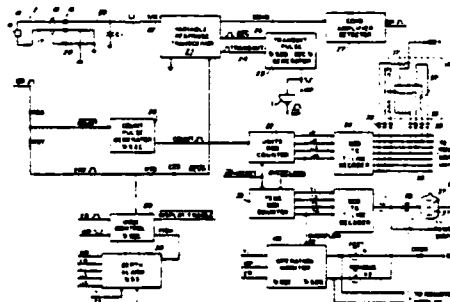
U.S. Cl. 340—3 R

16 Claims

A digital depth sounder in which a pulse of radiant energy is directed towards a reflecting object, and reflection is detected by a receiver, wherein the time between the transmitted and received pulses are measured as an indication of the distance to the reflector, and in which both the gain of the receiver and the power output of the transmitter are regulated in accordance with the strength of the received reflection.

Keywords: Sonar, depth sounder

U.S. Cl. X.R. 340-3E



MAY 22, 1973

3,733,830
TIDAL FLOW SYSTEM AND METHOD FOR CAUSING
WATER TO FLOW THROUGH WATERWAYS
Marcellus L. Jacobs, Rt. 3 Box 722, Fort Myers, Fla.
Filed June 7, 1971, Ser. No. 150,286
Int. Cl. E02b 3/00, 15/00

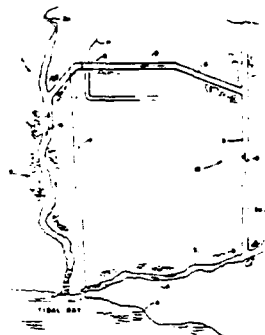
U.S. Cl. 61-1

13 Claims

A tidal flow system and method for causing flow of water through waterways to flush said waterways and prevent stagnation of water and accumulation of debris therein, wherein a one-way valve means is in said waterway between the ends thereof, said valve means being closed when the depth of water on the discharge side of the valve is greater than on the inlet side of the valve and said valve means being opened when the depth of water on the discharge side of the valve is less than on the inlet side thereof, the depth of water at least on the discharge side of the valve being controlled by tidal action.

Keywords: Channel barrier; Tidal estuary water level; Tidal estuary water quality

U.S. Cl. X.R. 61-2; 61-16; 61-19; 61-25; 137-236



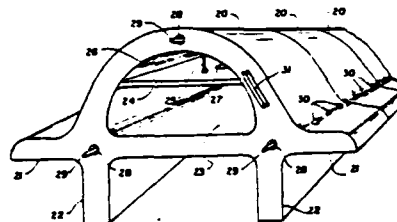
3,733,831
METHOD AND APPARATUS FOR PREVENTING
EROSION AND FOR CONVEYING
Charles W. Slicker, Jr., Mohnton, Pa., assignor to Gray Tech Industries, Inc., Mohnton, Pa.
Continuation-in-part of Ser. No. 26,829, April 9, 1970. This application Mar. 12, 1971, Ser. No. 123,538
Int. Cl. E02b 3/06, 3/08

U.S. Cl. 61-4

5 Claims

This invention relates to improvements for preventing erosion of beaches by tidal waves comprising placing a plurality of conduit units in mating end-to-end relationship and bolting them together by stressing wires extending through registering holes. Each unit has a pair of deep legs or drag footers through which fluid is forced so as to stabilize the support. The same type of structure when considerably increased in size may serve as a vehicular tunnel and may be provided with a horizontal partition to provide ventilation at the top of the tunnel.

Keywords: Breakwater, concrete; Seabed foundation; Wave absorber beach



3,734,046

FLOATING DRY DOCK

Otto W. Schmidt, Leawood, and Richard O. Schmidt, Prairie Village, both of Kans., assignors to The Firmen L. Carswell Manufacturing Company, Kansas City, Kans.

Filed May 10, 1971, Ser. No. 141,865

Int. Cl. B63b 35/00

U.S. Cl. 114-0.5

8 Claims

A floating dry dock consisting of a buoyant platform having a section adapted to be pivoted downwardly to form a ramp extending at its free edge beneath the water level, and up which a boat may be pulled from the water to the platform, the ramp section having sufficient buoyancy to support the boat, or that portion of the boat weight eventually supported thereon, cable mechanism for pivoting the ramp section downwardly against its natural buoyancy, cable mechanism for pulling a boat upwardly along the ramp section, locks for holding the ramp section releasably in its elevated position, and supports on the platform and ramp section for carrying the boat.

Keywords: Small-craft launcher; Small-craft service structure

U.S. Cl. X.R. 114-43.5



3,734,206

POWER-OPERATED HAMMER

Anthony Edward Walter Last, Stowmarket, England, assignor to The British Steel Piling Company Limited, Ipswich, Suffolk, England

Filed Apr. 29, 1971, Ser. No. 138,439

Claims priority, application Great Britain, May 4, 1970, 21,277/70

Int. Cl. E02d 7/12

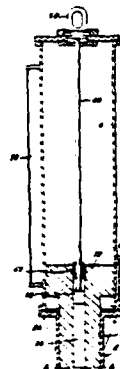
U.S. Cl. 173-137

12 Claims

A power-operated hammer has a fluid-pressure piston and cylinder arrangement for generating the working impulses. The top of the piston fits an upper part of the cylinder to seal off a space such that the volume of the sealed space increases as the piston makes a return movement and a partial vacuum is created so that the resultant air pressure acting on the piston accelerates the reversal of its movement and increases the cycle frequency.

Keywords: Pile driver, impact

U.S. Cl. X.R. 123-46



3,734,294

POLLUTANT RECOVERY SYSTEM

James J. Zerbe, 2323 5th Avenue, San Rafael, Calif.

Filed Jan. 15, 1971, Ser. No. 106,844

Int. Cl. E02b 15/04

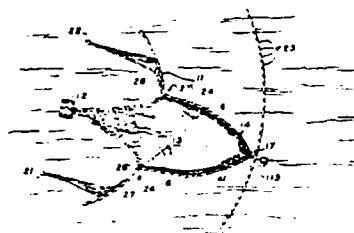
U.S. Cl. 210-242

10 Claims

A system is described for removing a pollutant from the surface of water wherein the pollutant is confined to a recovery area and is directed to a recovery station by a plurality of linked booms. A particulate, floatable sorbent material is continuously distributed over the pollutant confined in the recovery area as it moves to the recovery station. The sorbent material is distributed in sufficient quantity to adsorb substantially all of the pollutant prior to its arrival at the recovery station. At the recovery station, recovery means are employed for removing the sorbent material and the adsorbed pollutant from the water surface.

Keywords: Pollutant absorption; Pollutant collection; Pollutant, mechanical removal; Pollutant removal watercraft

U.S. Cl. X.R. 210-DIG, 21



3,734,564

ENDLESS BUCKET DREDGE WITH ARTICULATED LADDER AND SWELL COMPENSATOR

Cameron Edward McKay, 1632 Coronado Way, Burlingame, Calif., and George Paton Barker, Belmar, 85 Sauchensh Road, Kirkcaldy, Fife, Scotland

Filed Apr. 27, 1970, Ser. No. 31,945

Int. Cl. E02f 3/14, 3/16, 7/06

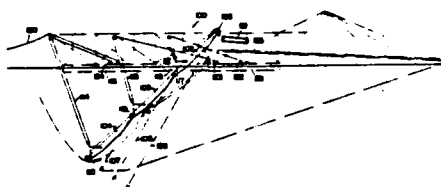
U.S. Cl. 299-9

30 Claims

A deep-digging floating dredge having an articulated ladder with two or more sections pivoted together for relative swinging movement in a vertical plane only and a digging bucket line supported by the ladder. The dredge ladder may have a fixed uppermost section, with either the same or a different bucket line. For sea-going use the dredge may have sounding means for determining instantaneously the height of the hull above the bottom of the water on which the hull is floating, angle sensing means for determining instantaneously the angle to the horizontal of the upper movable ladder section, and control means receiving an input depth signal and an input angle signal controlling the suspension length of the articulated ladder sections and accommodating it to swells in the water level on which the hull floats.

Keywords: Dredge ladder control; Dredge, mechanical

U.S. Cl. X.R. 37-69; 198-94; 254-172



3,735,129

**METHOD FOR LOCATING THE POSITION OF MEMBERS
RELATIVE TO EACH OTHER**

James William Montgomery, and Michael D. Reifel, both of
Houston, Tex., assignors to Tenneco Oil Company, Houston,
Tex.

Filed Aug. 20, 1971, Ser. No. 173,535
Int. Cl. G01n 23/02

U.S. Cl. 250-65

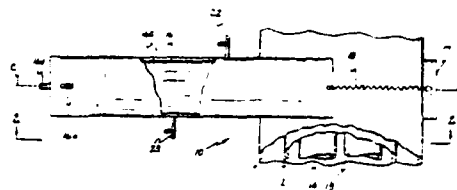
8 Claims

Energy from a point source is directed through a plurality of non-visible structures having known dimensions in a given plane. Variations in the density of the material traversed by the energy vary the intensity of the energy reaching a photographic film. Within the plane including the energy source and the film, the distance from the source to each of the structures determines the lateral dimensions and the relative position of the structure's image on the film. Given the distance between the source and the film, the lateral dimensions of the structures and the lateral position, size and intensity of the image cast by each of the structures on the film, the relative location of all such structures with respect to the known position of a reference structure may be determined either graphically or mathematically.

The device employed in the practice of the present invention includes a source of radio active energy carried in a camera housing which supports the source at a known, fixed distance from the reference structure. A film holder mounts the film behind the non-visible structures so that energy emitted from the source travels through the structures before striking the film. A small aperture in the camera housing focuses the energy causing it to radiate from a point. In use, the housing is flooded with water, lowered below the water surface and positioned about a subsurface well structure. The water in the housing is replaced with air after the housing is in place to reduce energy attenuation caused by the water.

Keywords: Instrument, radioisotope; Structure inspection

U.S. Cl. X.R. 250-83.3D



MAY 29, 1973

3,736,554

SEISMIC EXPLORATION

Maurice Barbier, Ousse, France, assignor to Societe Anonyme
dit: Societe Nationale Des Petroles D'Aquitaine, County of
Courbevoie, France

Filed June 19, 1969, Ser. No. 834,813

Claims priority, application France, June 27, 1968,
68156787

Int. Cl. G01v 1/38

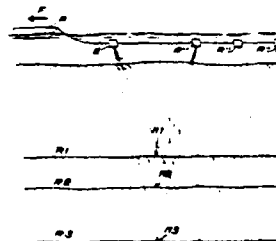
U.S. Cl. 340-7 R

5 Claims

Seismic exploration is effected using a seismic transmitter and at least one receiver which are moved in a continuous manner at a constant distance apart while the transmitter transmits a continuous series of long signals and the received signals are recorded without interruption. The transmitted signals are then correlated with corresponding parts of recorded signals to obtain seismic information.

Keywords: Seismic survey method

U.S. Cl. X.R. 340-15.5CC; 340-15.5CP



JUNE 5, 1973

3,736,677
SILT DREDGING METHOD

Henry Albert Lay, 87 North 11th W., Provo, Utah
Division of Ser. No. 54,910, July 13, 1970, Pat. No. 3,679,004.
This application Mar. 24, 1972, Ser. No. 237,757
Int. Cl. E02f 5/28

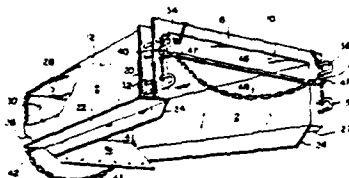
U.S. Cl. 37-195

4 Claims

A method involving two aspects. One comprises dragging a suitable scraper from a position remote from the shore of a body of water toward it and lifting the scraper, i.e., not dumping it, at the place the silt is to be deposited above its load of silt. The second aspect, which can be used alone or preceding the first comprises dragging the scraper along the bottom of the body of water only in the area to be deepened to loosen and agitate the silt to put it in suspension so that normal currents in the body of water carry it towards the shore. Thereafter, if desired, and with relatively short path of travel, a scraper can pull redeposited silt near the shore onto it.

Keywords: Dredge, mechanical

U.S. Cl. X.R. 37-115; 172-26.5



3,736,756
METHOD AND APPARATUS FOR ASSEMBLING AN
OFFSHORE STRUCTURE

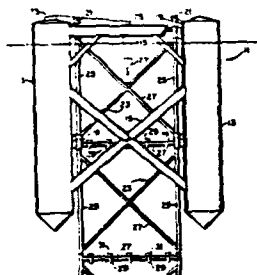
James R. Lloyd, Houston, Tex., assignor to Esso Production
Research Co., Houston, Tex.
Filed Nov. 3, 1971, Ser. No. 195,087
Int. Cl. E02b 17/00

U.S. Cl. 61-46.5

9 Claims

Method and apparatus are disclosed for constructing a buoyantly supported tower at an offshore worksite. Apparatus is disclosed for assembling an elongated tower at an offshore location by connecting a number of tower segments in end-to-end relationship. The apparatus includes a rigid buoyant structure provided with a central vertical well. The buoyant structure is provided with means for locking a tower segment in a preselected position within the well to permit connection of its upper end to an additional tower segment, and for releasing the locked segment to permit the newly connected tower segment to be lowered within the well and locked in place for the connection of an additional tower segment thereto. The method includes the step of positioning a tower segment at a preselected position within the well, aligned with the locked segment and rigidly connected thereto. The locked segment is then released and the rigidly connected segments are lowered and locked into place to permit the joining of additional tower segments. Additional segments are joined to the assembled section and lowered toward bottom until the tower extends to bottom. The buoyant assembly may then be elevated relative to the tower and rigidly affixed to the upper end.

Keywords: Offshore construction; offshore platform anchor; Offshore platform, floating



3,736,759

PILE COVERING

Werner Blose, 2000 Hamburg 20, Germany, assignor to
Schlegel Manufacturing Company, Rochester, N.Y.

Filed Feb. 10, 1972, Ser. No. 225,217

Claims priority, application Germany, Feb. 17, 1971, P 21
07 446.4

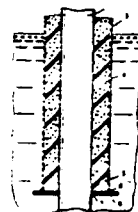
Int. CL E02d 5/60

U.S. CL 61-54

7 Claims

The invention applies to sheaths for protecting underwater bodies such as piles by surrounding the body with the lower end of the sheath secured to the body and the space between the sheath and the body filled with a yieldable filler material. The improvement is that the filler material is an expandable, synthetic material expanded in place between the shell and the body to form a closed-cell foam having a snug, sealing bond with the surface of the body.

Keywords: Coating; Corrosion prevention;
Pile protection



3,737,040

VESSEL FOR THE REMOVAL OF OIL ON WATER

Sverre Brydoy, Spireaveien 6, 3150 Tolvsrod, and Aage Slet-
sjoe, Job. Weissmanns vei 7b, 3155 Asgardstrand, both of
Norway

Filed Apr. 27, 1971, Ser. No. 137,888

Claims priority, application Norway, May 4, 1970, 1677/70

Int. CL C02b 9/02; E02b 15/04

U.S. CL 210-206

8 Claims

The present invention relates to an improved vessel for removing oil from water surfaces, said vessel comprising means for carrying out both a mechanical and a chemical removal of the oil. Thus, in the first part of the vessel there are means for taking in water and oil and for the separation thereof by a skimming device. In the rear part of the vessel which part communicates with said first part over an adjustable overflow means, are arranged means for spraying chemicals onto the overflow from said first part. An outlet wherein a propulsion means for the vessel is placed, is located in the rear part thereof.

Keywords: Pollutant removal watercraft;
Pollutant, suction removal

U.S. CL. X.R. 210-DIG.21; 210-242



JUNE 12, 1973

3,738,029
DREDGING HEAD WITH PIVOTALLY MOUNTED MUD SHIELD

James D. Harmon, Minneapolis, Minn., assignor to Inland Service Corporation, Minneapolis, Minn.

Filed Dec. 10, 1970, Ser. No. 96,705

Int. Cl. E02f 3/92

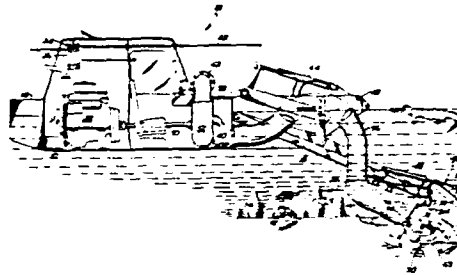
U.S. Cl. 37-66

11 Claims

A dredging head with a pivotally mounted mud shield and cooperating intake assembly. A head located at the end of a dredge boom has digging and conveying screw augers attached to a rotating shaft to loosen material such as mud, silt, and weeds from the bottom of a body of water and convey it toward an intake assembly which includes a suction intake conduit, a rotor, a stationary anvil, and an arcuate bar assembly. The mud shield confines material near the augers so the material can be conveyed by the augers to the rotor, stationary anvil, and arcuate bar assembly which cooperate to cut and shred the dredged material as it is pulled into the suction intake conduit. The arcuate bar assembly reinforces both suction intake conduit and stationary anvil and provides support for the rotor to prevent shaft deformation if collision with an underwater obstruction flexes the shaft against the arcuate bar assembly.

Keywords: Dredge, cutterhead; Dredge intake; Water plant removal

U.S. Cl. X.R. 37-57



3,738,113
OFFSHORE OIL STORAGE STRUCTURE WITH SUBMERGENCE SHELL

James Victor Madary, and William A. Davis, both of Glen Ellyn, Ill., assignors to Chicago Bridge & Iron Company, Oak Brook, Ill.

Filed Oct. 14, 1971, Ser. No. 189,227

Int. Cl. E02b 17/00; B65d 89/10

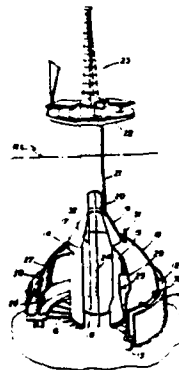
U.S. Cl. 61-46.5

14 Claims

An offshore structure floatable to a site for positioning on the floor of a body of water having a roof shell enclosing a volume therebelow, said roof shell having a peripheral ballasting ring, a conduit to remove air from beneath the roof shell and supply the same with liquid in submerging the structure, a submergence shell joined at its bottom to the roof shell and extending upwardly spaced away from the roof shell thereby defining a material well between the submergence shell and the roof shell, a plurality of partitions dividing the material well into compartments, means to supply ballasting material to, and remove it from, the material well, at least one hollow vessel joined to the roof shell, said hollow vessel being of such size that the buoyancy of the vessel will statically float the roof shell above the floor of a body of water partly or fully submerged at least with all air removed from beneath the roof shell and with the material well full of ballasting material and means to supply ballasting material to, and remove it from, the hollow vessel.

Keywords: Offshore storage tank, emergent

U.S. Cl. X.R. 61-34; 114-.57



3,738,115
METHOD AND APPARATUS FOR PLASTIC HYDRAULIC MATERIAL

Giichi Inoue, Osaka; Naoshi Kubo, Ashiya-shi, and Shogo Hatano, Osaka, all of Japan, assignors to Osaka Cement Co., Ltd.; Naoshi Kubo and Osaka Consulting Engineers, Ltd.
 Filed Mar. 28, 1972, Ser. No. 238,795
 Int. Cl. E02d 5/32

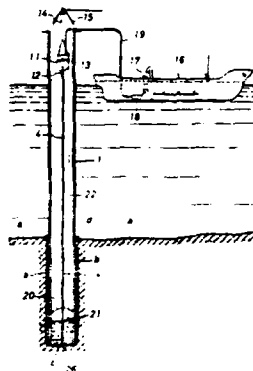
U.S. Cl. 61-63

6 Claims

Method and apparatus for placing hydraulic material through watertight flexible tubes onto the bottom of a steel column, in which said apparatus consists of watertight flexible tubes for transferring said hydraulic material; supporting pipes holding said tubes therein and having apertures on the wall portions; and a steel column holding said pipes therein and receiving the transferred hydraulic material onto the bottom thereof.

Keywords: Concrete form; Offshore caisson; Offshore construction; Seabed foundation; Seabed material placement

U.S. Cl. X.R. 61-53; 61-53.74; 61-56; 61-64



3,738,164
MEASUREMENTS PERTAINING TO OCEAN CURRENTS BY GEOMAGNETIC INDUCTION

Thomas B. Sanford, West Falmouth, and Robert G. Drever, Hatchville, both of Mass., assignors to Woods Hole Oceanographic Institution, Woods Hole, Mass.
 Filed May 21, 1971, Ser. No. 145,816
 Int. Cl. G01n 9/08

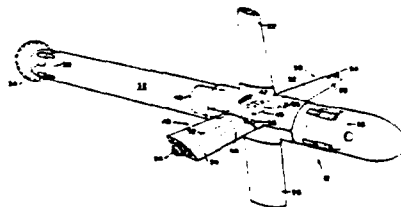
U.S. Cl. 73-170 A

37 Claims

The variations in the magnitudes and the directions of horizontal ocean currents are measured as a function of depth. A measuring probe falls to a predetermined depth and is carried by the current. The probe has a circuit within which a varying electric potential is induced by the earth's magnetic field. This potential is a function of the velocity of the probe and the velocity of the sea water. Data derived from this potential and the related sea water temperature and pressure are used to derive detailed vertical characteristic profiles of ocean currents.

Keywords: Current measurement; Depth pressure measurement; Instrument deployment

U.S. Cl. X.R. 73-189



3,739,325

METHOD AND DEVICE FOR EVALUATING ECHO SIGNALS WITH ECHO SOUNDING SYSTEMS HAVING DIGITAL INDICATION

Reinhard Ludwig, Kiel, Germany, assignor to Electroacoustic Gesellschaft m.b.H., Kiel, Germany

Filed June 10, 1971, Ser. No. 151,847

Claims priority, application Germany, June 13, 1970, P 20 29 311.2

Int. Cl. G01s 9/68

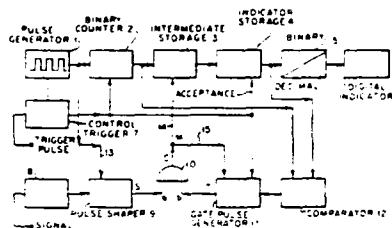
U.S. Cl. 340-3 R

4 Claims

Method of evaluating echo signals with echo sounding systems having digital indication of the sounding depth determined by the transmission time of the bottom echo includes comparing the transmission time of at least those echo signals having the intensity of bottom echos appearing in a given sounding period with the transmission time corresponding to the sounding results of a preceding sounding period and, from these echo signals, evaluating as bottom echo that signal having a transmission time differing least from the transmission time of the echo signal evaluated as bottom echo in the preceding sounding period, and system for carrying out the method.

Keywords: Sonar, depth sounder

U.S. Cl. X.R. 340-1R



3,739,326

HYDROPHONE ASSEMBLY

Wayne L. Kerr; Thomas W. Duggan, both of Houston, Tex., and Billy W. Davis, Flagstaff, Ariz., assignors to Schlumberger Technology Corporation, New York, N.Y.

Filed July 26, 1971, Ser. No. 166,251

Int. Cl. G01v 1/38

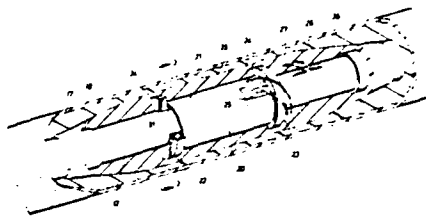
U.S. Cl. 340-7 R

7 Claims

A hydrophone assembly for use in a marine streamer having a cable core includes a piezoelectric crystal in the form of cylinder that is mounted in concentric relation on the cable core by cap assemblies. Each cap assembly is formed in two separate halves that can be fitted together and sealed with respect to the cylinder and core after the crystal is in place and has been connected to the electrical conductors inside the core.

Keywords: Seismic hydrophone

U.S. Cl. X.R. 340-3T; 340-10; 340-17



JUNE 19, 1973

3,739,503

**HYDRAULIC DREDGE HAVING ARTICULATED
LADDER AND SWELL COMPENSATOR**

George P. Barker, "Belmar," 85 Sauchenbush Rd., Kirkcaldy,
Scotland, and Cameron E. McKay, 1632 Coronado Way,
Burlingame, Calif.

Filed Aug. 11, 1970, Ser. No. 62,962

Int. Cl. E02F 3/88

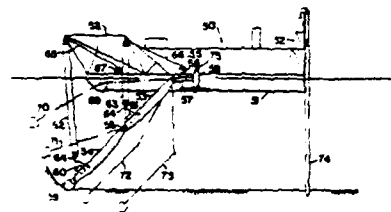
U.S. Cl. 37-67

7 Claims

A deep-digging floating hydraulic dredge having an articulated ladder with two or more sections pivoted together for relative swinging movement in a vertical plane only with a cutter head or other digging device and pump pipeline supported by the ladder. For sea-going use the dredge may have sounding means for determining instantaneously the height of the hull above the bottom of the water on which the hull is floating, angle sensing means for determining instantaneously the fore-and-aft angle to the horizontal of the dredge hull, and control means receiving an input depth signal and an input angle signal controlling the suspension length of the articulated ladder sections and accommodating it to swells in the water level on which the hull floats.

Keywords: Dredge, cutterhead; Dredge ladder control; Dredge propulsion

U.S. Cl. X.R. 37-72; 254-172



3,739,584

**FLOATING BARRIER FOR CIRCUMSCRIBING OIL
POOLS OR LIKE REFUSE**

Marcel Andre Belin, 11 rue Voltaire, Nantes (44 Loire Atlan-
tique), France

Filed June 1, 1971, Ser. No. 148,473

Int. Cl. E02b 15/04

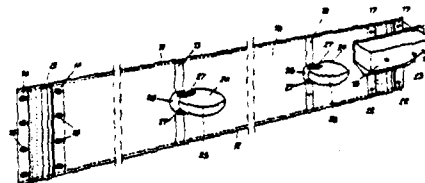
U.S. Cl. 61-1 F

3 Claims

A floating barrier for circumscribing and trapping oil films or like refuse in harbors and other bodies of water comprises a strip of noncorrodible material such as stainless steel and pair of buoyant floats removably fitted at intervals on opposite sides of the strip so as to support it vertically in the body of water. Junction means interconnect the floats pairwise and are removably engaged through the strip. A pair of watertight stabilizing compartments is removably secured to opposite sides of an end portion of the strip and are connectible to a hauling or towing craft.

Keywords: Pollutant, surface barrier

U.S. Cl. X.R. 61-5 "



3,739,588

RESILIENT RETAINING WALL

Richard C. Schroter, Orinda, and David C. Thomas, Moraga, both of Calif., assignors to Kaiser Aluminum & Chemical Corporation, Oakland, Calif.

Filed June 30, 1971, Ser. No. 158,188

Int. Cl. E02d 5/06

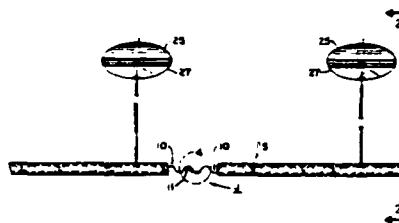
U.S. Cl. 61—49

2 Claims

A marine retaining wall and the like comprised of a series of hingedly interconnected corrugated metal sheets anchored in place by adjustable earth anchors, whereby adjacent corrugated sheets can move relative to each other in response to the normal movement of water, wave and soil without becoming disengaged from each other, fracturing, or losing their effectiveness in sealing the land off from the water.

Keywords: Bulkhead; Pile section connection; Pile, sheet; Pile, steel

U.S. Cl. X.R. 61-39; 61-62



3,739,913

**DEVICE FOR FENCING AND ABSORBING
CONTAMINATING OIL SPILLS ON WATER**

Theodore Oscar Bogosian, Somerville, N.J., assignor to John-Manville Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 805,465, March 10, 1969,

abandoned, which is a continuation-in-part of Ser. No.

748,977, July 31, 1968, abandoned. This application July 16,

1970, Ser. No. 55,338

Int. Cl. E02b 15/04

U.S. Cl. 210—242

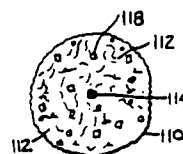
9 Claims

An elongate body of oil absorbing material and flotation material including longitudinal reinforcing or strengthening means whereby a plurality of bodies can be linearly disposed in end-to-end relationship for temporarily fencing oil spills on water for retention and absorption of the oil.

The body contents comprise oil absorbing fibers — natural or synthetic or combinations thereof — and may include a flotation material interspersed therewith to aid buoyancy of the body even after saturation of the fibers by oil.

Keywords: Pollutant absorption; Pollutant, surface barrier

U.S. Cl. X.R. 210-484; 210-DIG.21



3,740,098

**MULTI-WHEEL UNDERWATER EXCAVATION
MACHINE**

Friedrich Lachnit, Mulheim/Rhur, Germany, assignor to
Deutsche Babcock & Wilcox Aktiengesellschaft,
Oberhausen, Germany

Filed Mar. 19, 1971, Ser. No. 125,983

Claims priority, application Germany, Apr. 3, 1970, P 20 15
894.5

Int. Cl. E02F 7/00

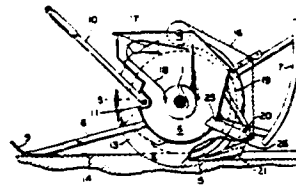
U.S. Cl. 299-8

5 Claims

An underwater excavating device having a cutting means to cut into underwater land surfaces, a collecting means for collecting the excavated material, and conveying means for conveying the collected material from the cutting means to the collecting means. A transporting wheel is centrally disposed on the device and has radially outwardly extending edges disposed laterally on each side of the wheel which form a channel around the circumference of the wheel. The conveyor belt, which is adapted to be received by the radially extending edges of the wheel and is disposed on the excavating device so as to be guided in the channel, conveys the collected material from the cutting means to the collecting means.

Keywords: Dredge, cutterhead; Dredge intake

U.S. Cl. X.R. 37-9; 37-54



3,740,454

CONTROLLED BUOYANCY ELECTRICAL STRAND

Rudolph P. Arndt; William W. Ulmer, and Daniel G. Stone, all
of Muskegon, Mich., assignors to The Anaconda Company,
New York, N.Y.

Filed Jan. 6, 1972, Ser. No. 215,858

Int. Cl. H01B 7/12

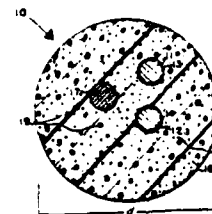
U.S. Cl. 174-101.5

11 Claims

A fine expendable wire strand with a slow, predetermined sinking rate in sea water is formed of enamel-film insulated conductors covered, along with a tensile strand, by a polymeric foam, interspersed with glass bubbles.

Keywords: Instrument cable

U.S. Cl. X.R. 174-110F; 174-113R



3,740,708
SEISMIC PNEUMATIC ENERGY SOURCE WITH BUBBLE
ELIMINATOR AND SIGNAL OSCILLATION
ATTENUATOR

William E. Phillips, Houston, Tex., assignor to Texaco, Inc.,
New York, N.Y.

Filed Dec. 27, 1971, Ser. No. 212,266
Int. Cl. H04b 13/02

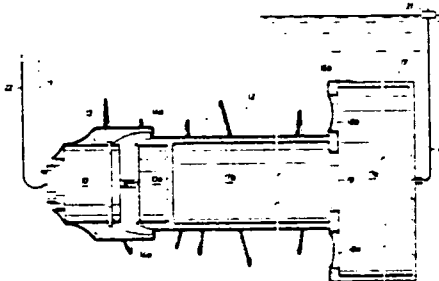
U.S. Cl. 340-12

19 Claims

A first chamber having a flexible outer wall for receiving expanding gas from a seismic pneumatic energy source for being inflated has a second chamber connected thereto for receiving the expanding gas from the first chamber, and alternatively, a vent to the atmosphere attached to the second chamber for containing all gas from the pneumatic source for eliminating the usual air bubble when activated underwater and for attenuating subsequent signal secondary oscillation after the desired initial acoustical signal pulse.

Keywords: Seismic explosive acoustic transmitter

U.S. Cl. X.R. 181-0.5R; 340-8



JUNE 26, 1973

3,740,955
FLEXIBLE OIL BOOM FOR HIGH SEA
Robert A. Fosberg, Montreal, Quebec, Canada, assignor to
Hurum Shipping & Trading Company, Ltd., Montreal,
Quebec, Canada

Filed July 7, 1971, Ser. No. 160,488
Int. Cl. E02b 15/04

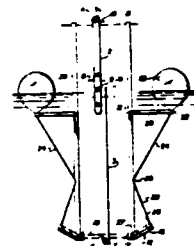
U.S. Cl. 61-1 F

9 Claims

A flexible oil boom is described which has unique capabilities of being compactly stored and also being extremely stable in heavy seas. The boom includes a curtain wall of sheet material for deploying in a substantially vertical position in the water such that the upper edge is above the water surface and the lower edge is below the water surface. A plurality of substantially vertical stiffening members are positioned in spaced relationship along the length of the curtain wall, these members being arranged in opposed pairs with the curtain wall sandwiched between. Outrigger members are connected on each side of the boom a short distance below the water line and each outrigger has an inner end pivotally connected to a stiffening member and an outer end having a connector for connecting a float thereto. A restraining member allows the outrigger to swing between a downward retracted position adjacent the stiffening member and an operating position substantially perpendicular to the stiffening member. Keel members are pivotally connected to the lower ends of the stiffening members at both sides of the curtain wall and these keels are held by restraining members which allow them to swing between an upper retracted position adjacent the curtain wall and an operating position in which they are upwardly and outwardly inclined.

Keywords: Pollutant, surface barrier

U.S. Cl. X.R. 61-1F



3,740,956

PORTABLE RETAINING STRUCTURE

Arthur L. Guy, Houston, and David E. Galloway, Simonton, both of Tex., assignors to Esso Production Research Company, Houston, Tex.

Filed Nov. 12, 1970, Ser. No. 198,127

Int. Cl. E02d 21/00

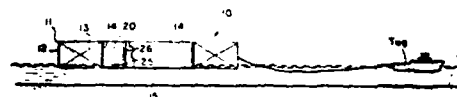
U.S. Cl. 61-46.5

12 Claims

A portable marine structure for use as an artificial island and retaining support for fill material includes a tank member having a base member and a wall member sealed to the base member and capable of being flooded with water and sunk in a body of water with flood water to be replaced by select fill material, that may or may not be frozen to resist ice forces against the retaining structure. The floatable structure also includes an outer shell having an outer wall member spaced from and surrounding the tank wall member and a truss system connecting the tank wall member to the outer wall member. The outer shell is open at top and bottom. The artificial island structure is created by floating the marine structure to a desired water location, sinking the structure by flooding the tank with water and then anchoring the structure by filling the outer shell with fill material. When the structure is to be salvaged, it is floated by removing the fill material from the outer shell and removing water from the tank member.

Keywords: Offshore construction; Offshore island; Ice structure

U.S. Cl. X.R. 62-260



3,741,119

REMOTE ROCK BREAKING METHOD APPARATUS THEREFOR

Robert E. Eckels, 2101 Youngfield, Golden, Colo.

Filed Feb. 22, 1971, Ser. No. 117,537

Int. Cl. F42d 1/02, 3/00

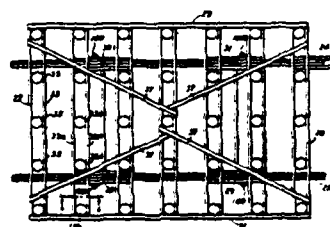
U.S. Cl. 102-23

12 Claims

A method of remotely breaking rock, or the making of predetermined size holes in the earth, in a precise position, suspends an assembly of prepositioned shaped charges in a pendulum array between a distance line of sight signal generator and receiver for such signal for accurately positioning the charges in a predetermined location. The pendulum array may be precisely laterally aligned along the predetermined line, and longitudinally along the line in accordance with predetermined mappings. The method provides a means of explosively forming trenches along the bottom of bodies of deep water, the precision breaking of underwater rocky barriers, etc., using an optimum spacial arrangement of a plurality of charges. The spacial arrangement being determined by testing on similar rock. The apparatus for such method includes articulated sinking rafts supporting such specially arranged charges which are arranged for lateral and longitudinal leveling.

Keywords: Seabed trencher

U.S. Cl. X.R. 102-24HC



3,741,320

SUBSEA DRILLING ASSEMBLY

Karl Erik Hilfing, Stockholm, Sweden, assignor to Atlas Copc. Aktiebolag, Nacka, Sweden

Filed July 12, 1971, Ser. No. 161,851

Int. Cl. E21b 19/14, 47/02

U.S. Cl. 175-6

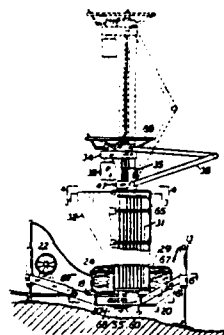
19 Claims

An off-shore drilling assembly comprises a main body which has sheaves or pulleys so that it can be lowered from a vessel like a block.

The main body performs a core drilling operation resting on the seabed. A traveller body can be pulled up and down between the vessel and the main body, fetching a core-containing core barrel inner tube from the bore-hole and delivering it to the vessel and returning it the emptied core barrel inner tube to the core barrel outer tube at the bottom of the bore-hole. The traveller body is firmly attached to the main body when it lands thereon.

Keywords: Sampler, power supply; Sampler, seabed-drilled core

U.S. Cl. X.R. 175-45; 175-85; 175.52



3,741,333

GENERATORS OFF FLUID WAVE TRAINS

Raymond Muniz, Versailles, and Robert Argirakis, Legue de Longroi, both of France, assignors to Compagnie Generale De Geophysique, Paris, France

Filed Jan. 23, 1969, Ser. No. 793,415

Int. Cl. G01v 1/02

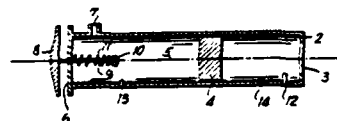
U.S. Cl. 181-5 H

7 Claims

A generator produces vacuum or pressure surges in a sea or a lake so as to form seismic wave trains passing through the bottom of the water bed and back into the water for subsequent investigation. The generator includes a movable system, mainly a disc or a cylinder cover adapted to move between predetermined limits under the impact of a hammering means constituted as a piston urged forwardly in a cylinder so as to violently strike the rear end of the movable system and to produce thereby the desired surges to the rear and/or front of the movable system. The hammering means is subjected when released to the hydrostatic pressure which urges it forwardly into engagement with the rear end of the movable system constituted advantageously by a rod rigid with the disc or the like and extending coaxially in the cylinder for cooperation with the piston.

Keywords: Seismic implosive acoustic transmitter

U.S. Cl. X.R. 116-137R; 340-7; 340-17



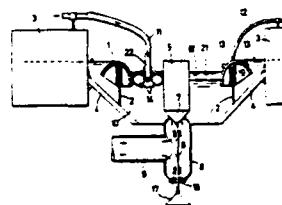
3,741,391
**APPARATUS FOR ELIMINATING OIL SLICKS FROM
 LARGE BODIES OF WATER**
 Ferdinand Philipp Donsbach, Rudesheimer Str. 35b, 655 Bad
 Kreuznach, Germany
 Filed Jan. 13, 1971, Ser. No. 106,202
 Claims priority, application Germany, June 19, 1970, P 20
 30 209.4

Int. Cl. B01d 23/00
 U.S. Cl. 210—123 12 Claims

Water contaminated with an oil slick is drawn into and con-
 fined within a large tub shaped vessel so that the lighter con-
 taminating liquid can be drawn off at the top while the water is
 pumped away from a lower level.

Keywords: Pollutant, suction removal

U.S. Cl. X.R. 210-DIG.21; 210-242

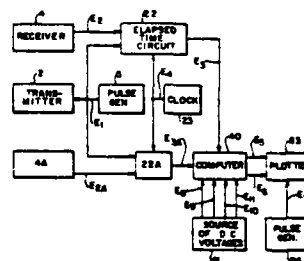


3,742,435
FATHOMETER MEANS AND METHOD
 Keh Pann, and Steven A. Stubblefield, both of Houston, Tex.,
 assignors to Texaco Inc., New York, N.Y.
 Filed June 3, 1971, Ser. No. 149,595
 Int. Cl. G01s 9/68

U.S. Cl. 340—3 R 7 Claims

A fathometer, for measuring the depth in water to a sloping
 bottom surface, includes a transmitter, periodically providing
 pulses in the water, and at least a pair of receivers arranged in
 a predetermined manner with the transmitter. Each receiver
 receives reflection pulses of the transmitted pulses from the
 sloping surface. Synchronizing pulses coinciding with the
 transmitted pulse and outputs from corresponding receivers
 control elapsed time circuits to provide signals corresponding
 to time intervals. Each time interval starts with the transmis-
 sion of a pulse by the transmitter and the reception of a reflec-
 tion pulse by a corresponding receiver. An analog computer
 provides outputs corresponding to the water's measured depth
 and to the location of the depth measurement in accordance
 with the time interval signals and the known predetermined
 arrangement of the transmitter and the receivers. A recorder
 provides a record of the depth measurement and its proper lo-
 cation in accordance with the outputs from the analog com-
 puter.

Keywords: Sonar, depth sounder



3,742,436

SIDE LOOKING SONAR APPARATUS

Charles H. Jones, Murrysville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 24, 1971, Ser. No. 127,654

Int. Cl. G01s 9/66

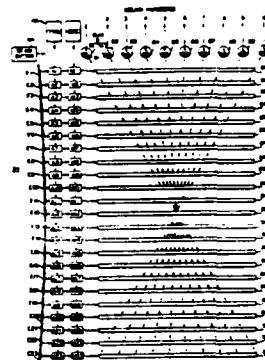
U.S. Cl. 340-3 R

12 Claims

A side looking sonar transmitter projects acoustic energy to sonify a certain area on the sea bottom. A receiver apparatus forms a plurality of receiver beams for receiving reflected projected acoustic energy from a plurality of adjacent receiver strips. A display apparatus is provided for portraying signals associated with these strips. The area portrayed is made equal to or less than the area sonified and the apparatus is utilized in a linear mode or a rotating mode.

Keywords: Sonar, side looking

U.S. Cl. X.R. 340-9; 343-5PC; 346-33EC



JULY 3, 1973

3,742,535

OPEN OCEAN SHALLOW WATER MOOR

Paul L. Horrer, La Jolla, and Robert M. Bridges, Northridge, both of Calif., assignors to The Bendix Corporation, Southfield, Mich.

Filed Mar. 31, 1971, Ser. No. 129,716

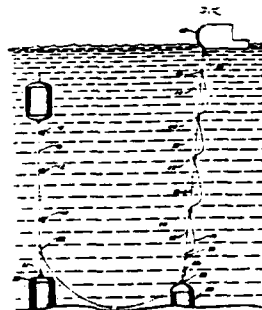
Int. Cl. B63b 21/00; G01w 1/00

U.S. Cl. 9-8 R

8 Claims

An open ocean moor is disclosed for use at comparatively shallow ocean depths. The moor consists of a buoy floating on the surface which is fastened to an anchor on the bottom by means of a flexible tether formed of a plurality of linked sections of highly elastic material such as rubber of relatively large cross-sectional area. The elastic sections are formed with heavy loops or eyelets at each end, and adjoining sections are connected by means of a link formed of two mating double grommet assemblies which, preferably, are also formed of mating configuration with respect to the loops to minimize stress concentrations. An electrical cable which is connected to various underwater instruments extends from the buoy to the anchor. This cable is supported on the flexible tether line by means of separate cable clamps on the links. A substantial amount of slack must be maintained in the electrical cable to allow for stretching during periods of high wave action without danger of pulling the cable taut. The electrical cable is fastened to the anchor and to the buoy by means of cable termination devices of a type known in the art.

Keywords: Buoy mooring system; Instrument deployment



3,742,715
**PROTECTING A STRUCTURE IN WATER COVERED
 WITH SHEET ICE**

Kenneth G. Nolte, Tulsa, Okla., assignor to Amoco Production Company, Tulsa, Okla.

Filed June 9, 1971, Ser. No. 151,334

Int. Cl. E02b 3/00, 15/02

U.S. Cl. 61-1

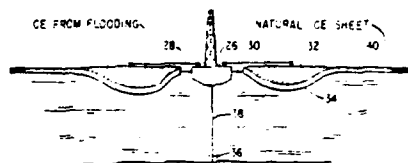
9 Claims

This invention relates to a method of protecting a structure such as a vessel or platform located in water covered with an ice sheet. It especially relates to those areas in which pressure ridges (a region of built up ice rubble formed by thrusting action of two sheets of ice.) occur in the ice such as in the Arctic regions. In a preferred embodiment, a thickened or strengthened section of ice is formed around at least a part of the structure and open water is maintained between the strengthened section of ice and the structure. Just outside the strengthened section of ice is a buffer zone in which the sheet of ice has been weakened such as by cutting trenches partly through the ice. When a pressure ridge occurs in the area of the structure being protected, it is directed through the weakened section of ice around the strengthened section of ice. The pressure ridge should form in the weakened section away from the structure being protected.

If a crack should occur between the legs of a temporary structure, it could damage such structure by pulling the legs apart. Here a weakened section of ice is provided away from the structure to cause the path of the crack to be away from the structure. Ways of strengthening the ice and making the weakened buffer zone are disclosed.

Keywords: Ice protection; Offshore structure fender; Ice structure

U.S. Cl. X.R. 61-46.5; 114-.5; 175-7



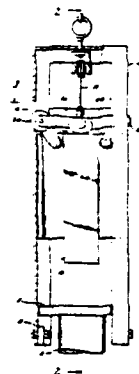
3,743,030
MECHANICAL PILE DRIVING HAMMER
 Henry A. Gifford, 2105 13th St., Galena Park, Tex.
 Filed Apr. 6, 1971, Ser. No. 131,731
 Int. Cl. E02d 7/08

U.S. Cl. 173-124

4 Claims

This all mechanical hammer is made of two parts: (1) the piston assembly which delivers the blow, (2) an outside frame to lift and guide the piston. There is a lock and trigger release mechanism which locks the piston in the upper part of the outer frame. The only lift line fastens to the outer frame lifts the complete assembly to a desired height. The lock is then hand tripped by an attached rope allowing the piston to fall and strike the pile. With the piston resting on the pile, the outer frame is lowered until the two parts are again locked together and ready for another cycle.

Keywords: Pile driver, impact



3,744,016

FOAM SEISMIC STREAMER

Billy W. Davis, Flagstaff, Ariz., assignor to Schlumberger Technology Corporation, New York, N.Y.

Filed Jan. 11, 1971, Ser. No. 105,547

Int. Cl. H04b 13/02; G01v 1/02

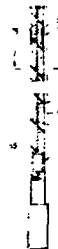
U.S. Cl. 340-7 R

7 Claims

A neutrally buoyant seismic hydrophone streamer is constructed by extruding a syntactic foam material comprising an elastomeric material and gas filled microspheres onto a central stress member to form an elongated streamer member. The streamer may then be covered with a suitable water and oil resistant, abrasion resistant covering and be provided with exteriorly affixed hydrophones, or hydrophones can be affixed to the foam core and an outer protective sheath can be extruded or otherwise provided around the streamer and the hydrophones to provide a uniform diameter streamer assembly. Extrusion is effected utilizing a suitable elastoplastic material which can be extruded at temperatures below about 300 psi to avoid bursting the gas filled spheres of the syntactic foam.

Keywords: Seismic streamer cable

U.S. Cl. X.R. 174-101.5; 174-110F; 340-9



3,744,018

METHOD OF AND APPARATUS FOR PRODUCING A REPETITIVE SEISMIC IMPULSE

Charles D. Wood, III, San Antonio, Tex., assignor to Southwest Research Institute, San Antonio, Tex.

Filed Dec. 22, 1971, Ser. No. 210,764

Int. Cl. H04b 13/00

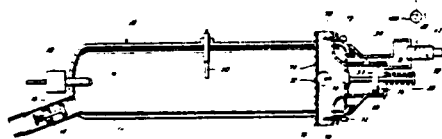
U.S. Cl. 340-12 SD

6 Claims

The improvement in the method and apparatus of producing a seismic source in water by a combustive explosion by reducing the oscillation of the explosive exhaust gas bubble in the water thereby reducing extraneous seismic impulses. Injecting an air/fuel mixture of less than the stoichiometric quantity into the chamber to provide an excess of air, and after the mixture has been exploded and released into the water, injecting additional fuel into the free air in the exhaust gases which provides additional combustion to increase the pressure in the exhaust gases to dampen the oscillation of the pressure in the gases. Injecting additional fuel into the hot exhaust gases and excess air for maintaining the exhaust gas bubble pressure at or above the water pressure surrounding the exhaust gases.

Keywords: Seismic explosive acoustic transmitter

U.S. Cl. X.R. 181-.5NC



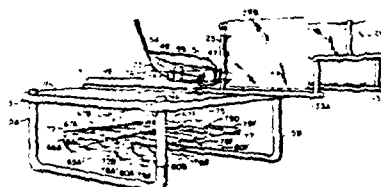
3,744,020
MARINE SEISMIC SOURCE
 Robert A. Kirby, Houston, Tex., assignor to Esso Production
 Research Company, Houston, Tex.
 Filed Sept. 22, 1971, Ser. No. 182,797
 Int. Cl. H04b 1/3100

U.S. Cl. 340-12 SD 7 Claims

A marine seismic source is described including an enclosure for containing a large quantity of gas. Disposed beneath the enclosure are one or more controlled seismic sources, preferably of the type wherein an explosive gaseous mixture is detonated within an expansible enclosure. Means are provided for the purpose of towing the source at a determinable depth from a vessel, and for stabilizing the apparatus during towing operations.

Keywords: Seismic explosive acoustic transmitter; Towed vehicle

U.S. Cl. X.R. 181-5NC



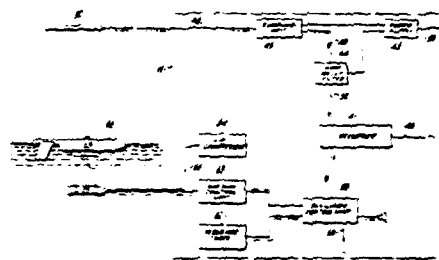
3,744,021
OFFSHORE SEISMIC EXPLORATION METHOD
 James D. Todd, Houston, Tex., assignor to Texaco Inc., New
 York, N.Y.
 Filed July 13, 1971, Ser. No. 162,104
 Int. Cl. G01v 1/00

U.S. Cl. 340-15.5 TC 7 Claims

A method of carrying out offshore-type seismic exploration. It involves simultaneous running of a deep-reflection profile and a shallow-reflection profile without substantial interference of one with the other.

Keywords: Seismic survey method

U.S. Cl. X.R. 181-G.5FS; 340-7; 340-15.5GP



JULY 10, 1973

3,744,253

OIL SPILL BOOM

Patrick Yelverton Williams; Kerry Charles Williams, both of Castlereag, N. S. W., and Charles Edward Heath, Caringbah, N. S. W., all of Australia, assignors to Stamford Australia Pty. Ltd., New South Wales, Australia

Filed Mar. 20, 1972, Ser. No. 235,901

Claims priority, application Australia, Mar. 29, 1971, 4444

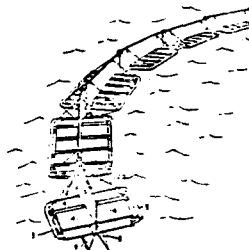
Int. Cl. E02b 15/04; B63c 35/00

U.S. Cl. 61-1 F

4 Claims

An oil spill boom to restrain the passage past the boom of oil spilt onto water. The boom comprises a plurality of alignable interconnectable floats, a continuous screen barrier extending through, between, above and below the floats with the part below the floats formed of two walls spread apart at the bottom to provide an open bottom water ballast chamber, props and stays to support the screen barrier erected.

Keywords: Pollutant, surface barrier



3,744,254

PROCESS AND APPARATUS FOR CONTAINMENT OF AQUEOUS POLLUTANTS

Richard P. Fennelly, 33-23 147th St., Flushing, N.Y.

Filed May 17, 1972, Ser. No. 253,981

Int. Cl. E02b 15/04

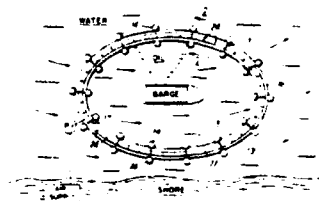
U.S. Cl. 61-1

9 Claims

An air or bubble barrier which can be used to contain and deflect aqueous pollutants, such as oil, flotsam and the like, is confined within its desired line of travel by placing a mesh material between at least one point adjacent the generation point of the gas below the surface of the water and a point which is adjacent the surface of the water. The mesh material can be ordinary wire screening used in household screens. The use of the mesh material insures that the bubble barrier will follow a desired line of travel largely unaffected by currents or eddies which would normally disperse the bubble stream to an undesirable extent.

Keywords: Pollutant, surface barrier

U.S. Cl. X.R. 61-6; 210-170; 210-242



3,744,257

WATER-SURFACE CLEANSING SHIP

William Frank Spanner, 4, Albion Terrace, The Common,
Patchway, Bristol BS12 6AN, Gloucestershire, England
Filed Dec. 1, 1971, Ser. No. 203,786
Int. Cl. E02b 17/00, 15/04

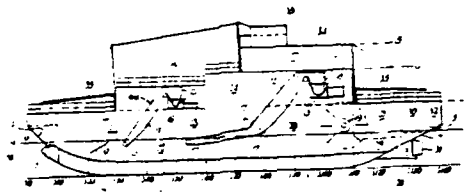
U.S. Cl. 61-46.5

10 Claims

A water-surface cleansing ship having a hull provided with a channel extending longitudinally through the hull. At least surface water to be cleansed is caused to flow in operation of the ship, through the channel, by motion of the ship either self-propelled or towed and/or by flow causing means such as a paddle wheel in the channel. The ship has means for removing and recovering contaminants such as oil from water flowing through the channel. The contaminant removing and recovering means preferably include a mesh grill, one or more conveyor belt and tank assemblies, and detergent sprays.

Keywords: Pollutant absorption; Pollutant, mechanical removal; Pollutant removal watercraft

U.S. Cl. X.R. 61-63; 114-.58; 210-DIG.21;
210-242



3,744,638

OIL MOP AND METHOD OF USING SAME

Herbert M. Rhodes, 5419 Pratt Drive, New Orleans, La.
Continuation-in-part of Ser. No. 52,448, July 6, 1970, Pat. No.
3,668,118. This application Apr. 13, 1971, Ser. No. 133,580
Int. Cl. E02b 15/04

U.S. Cl. 210-242

3 Claims

The present disclosure is directed to a method of removing oil from the surface of a body of water with an oil mop made of thin gauge narrow strips of polypropylene or similar material passed through the oil on the surface of water and then through wringers and/or water or chemical sprays or both to remove the oil from the mop, depositing the oil in a receptacle and returning the non-oil laden mop back into the oil covered water to pick up more surface oil.

Keywords: Pollutant absorption; Pollutant mechanical removal

U.S. Cl. X.R. 210-396; 210-DIG.21



3,745,115

METHOD AND APPARATUS FOR REMOVING AND RECLAIMING OIL-SLICK FROM WATER

Martin F. Olsen, 3192 Cambridge Ave., New York, N.Y.

Filed July 13, 1970, Ser. No. 54,509

Int. Cl. B01d 21/00, 33/40, E02b 15/04

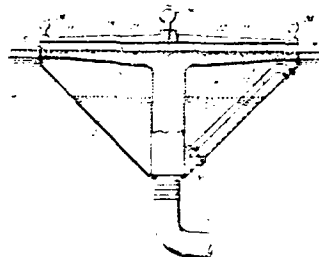
U.S. Cl. 210-83

6 Claims

One or more floats are provided for immersion in an oil-slick affected water area, the floats having a collecting compartment and a ballast compartment, and a limit valve for the ballast compartment, such that the floats will be partially submerged at the level of the collecting compartment so that the oil and water mixture may be collected. Flexible tubes are also provided for the collecting compartment for transferring the collected oil and water mixture to a separation tank. The separation tank has two ball float control valves, one of which permits the clean water to drain back into the environmental water area and the other of which permits the collected oil to be drained off for further use or refinement.

Keywords: Pollutant, suction removal

U.S. Cl. X.R. 210-DIG.21; 210-97; 210-119; 210-242



JULY 17, 1973

3,745,773

SAFETY OFF-SHORE DRILLING AND PUMPING PLATFORM

Byron H. Cunningham, Saratoga, Calif., assignor to Offshore Recovery System Inc.

Filed June 16, 1971, Ser. No. 153,507

Int. Cl. E02b 17/00; E02d 23/00; B01d 33/00

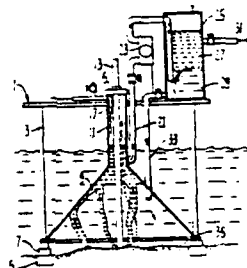
U.S. Cl. 61-46

1 Claim

A safety off-shore drilling and pumping platform is provided wherein the platform is equipped with a large catchment basin which is spaced above the ocean floor and which has an opening therein so that drilling and pumping operations can be conducted within the catchment basin. In the event of an oil leak means are provided for recovering oil which rises in the catchment basin, saving the oil and preventing pollution.

Keywords: Offshore platform, fixed; Pollutant collection; Pollutant, submerged barrier; Pollutant, suction removal

U.S. Cl. X.R. 61-1F; 210-242



3,745,774

**UNDERWATER ANCHOR STRUCTURE AND METHOD
OF SETTING SAME**

Frank W. Sharp, Jr., Houston, Tex., assignor to The Offshore
Company, Houston, Tex.

Filed July 27, 1970, Ser. No. 58,450

Int. Cl. B63b 21/00; E02d 3/54; E21b 7/12

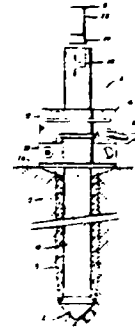
U.S. Cl. 61-46

4 Claims

An underwater anchor structure having a tubular body, a drill bit secured to the lower end of the body, a stop plate secured to the exterior of the body, means for releasably connecting the upper end of the body to a drill string and a swivel joint rotatably mounted around the body above the stop plate, part of the joint being releasably connected to said body and the method of setting such underwater anchor structure including the steps of drilling a well bore underwater with the anchor structure attached to a drill string, flowing cement through the drill string and the anchor structure into the well bore, releasing the drill string from the anchor structure and recovering the drill string while leaving the anchor structure cemented in the well bore; this abstract is neither intended to define the invention of the application which, of course, is measured by the claim, nor is it intended to be limiting as to the scope of the invention in any way.

Keywords: Embedment anchor; Grouting;
Offshore platform anchor

U.S. Cl. X.R. 114-206; 166-.5



3,745,775

UNDERWATER IN SITU PLACEMENT OF CONCRETE

Lawrence F. Kahn, Ann Arbor, Mich., assignor to The United
States of America as represented by the Secretary of the
Navy, Washington, D.C.

Filed Nov. 22, 1971, Ser. No. 201,016

Int. Cl. E02b 3/00

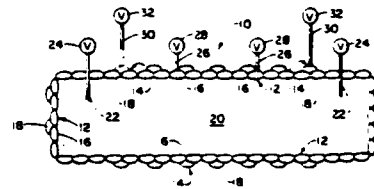
U.S. Cl. 61-46

5 Claims

A flexible container filled with dry concrete which will quickly set upon the addition of moisture. Because of the container's flexibility, it may be formed into any desired container to fit available space after which moisture is added.

Keywords: Concrete form; Seabed foundation;
Seabed material placement

U.S. Cl. X.R. 61-30; 61-63



3,745,776
**ANCHORING METHOD FOR OFFSHORE MARINE
STRUCTURES**

Laurence M. Hubby, Houston, Tex., assignor to Texaco Inc.,
New York, N.Y.

Filed May 13, 1971, Ser. No. 143,074
Int. Cl. E02d 5/44

U.S. Cl. 61—53.6

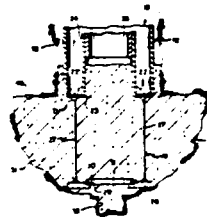
4 Claims

The invention relates to a method for forming an anchoring or foundation base for an offshore marine structure. Said method includes the embedment of an elongated support member lower end, which extends downwardly into the substratum and upwardly through the body of water. The lower end of said member is firmly fixed in the substratum by the application of a cement jacket thereabout which terminates at the lower end of the column in an outwardly projecting, partially bulbous cement base.

The apparatus for achieving said foundation includes an open structured anchoring cage which depends from the support member to form a firm engagement with the cement base.

Keywords: Embedment anchor; Grouting;
Offshore platform anchor

U.S. Cl. X.R. 61-46; 61-53.62



3,745,777
CONFIGURATIONS FOR ICE-RESISTANT PLATFORMS
Kenneth A. Blenkarn, Tulsa, Okla., assignor to Amoco Production Company, Tulsa, Okla.

Filed June 18, 1970, Ser. No. 47,403
Int. Cl. E02b 17/00

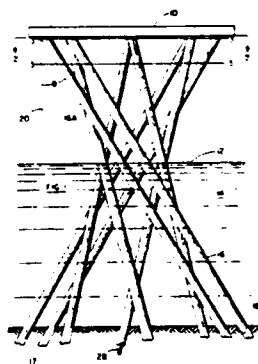
U.S. Cl. 61—46

8 Claims

This concerns a deck or platform supported by piles above a body of water. The deck is supported by slanted or battered piles which converge to a small apex area at about the water line elevation. The slanted piles permit the horizontal transfer of load into the soil by means of axial loading on the piles.

Keywords: Ice protection; Offshore platform,
fixed

U.S. Cl. X.R. 52-648



3,746,122
MULTI-DIRECTIONAL SEISMIC EXPLORATION
METHODS

Jlee Davis, Dallas, Tex., assignor to Avance Oil and Gas Co.,
Inc., Midland, Tex.

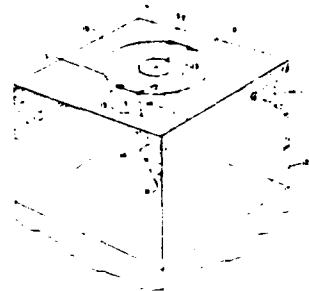
Filed May 21, 1971, Ser. No. 145,811
Int. Cl. G01v 1/13, 1/16

U.S. Cl. 181-5 R 21 Claims

A number of seismic detectors are located in a two-dimensional array on the surface of the earth, either on land or at sea. One or more seismic disturbances are produced in the vicinity of the seismic detectors at points located to produce sampling of various subsurface reflection points to form one or more two-dimensional areas of coverage. For each seismic disturbance, the subsurface reflections thereof received by the various seismic detectors are recorded. In some embodiments, the seismic disturbances are produced at points located to produce multi-directional sampling of each of various subsurface reflection points and recordings for different ones of the seismic disturbances are combined to produce stacked recordings wherein multi-directional reflections from common subsurface points are added.

Keywords: Seismic hydrophone array;
Seismic survey method

U.S. Cl. X.R. 340-15.5CP; 340-15.5; 340-15.5MC



3,746,123
METHOD OF AND SYSTEM FOR REDUCING
SECONDARY PRESSURE PULSES IN OPERATION OF
PNEUMATIC SOUND SOURCE IN WATER

Donald F. Huffhines, Richardson, Tex., assignor to Mobile Oil
Corporation, New York, N.Y.

Continuation of Ser. No. 31,103, April 23, 1970, abandoned.

This application May 23, 1972, Ser. No. 256,197

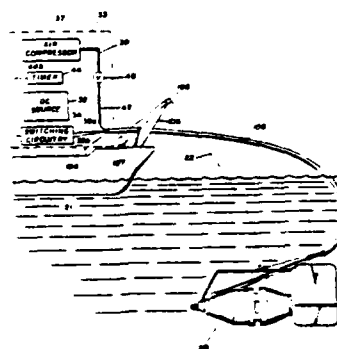
Int. Cl. G01v 1/14, 1/18

U.S. Cl. 181-5 EM 10 Claims

The specification discloses a device employed in a pneumatic sound source for controlling the release of gas through a chamber port to minimize secondary pressure pulses. In the embodiment disclosed, the device comprises an enlarged portion coupled to a release valve by way of a smaller supporting member, both of which pass through the port as the valve moves to its porting position. As the valve initially moves toward its porting position, gas pressure is rapidly released from the chamber through the port and into the water to generate a primary pressure pulse. As the enlarged portion of the gas control device passes into the port, the rate of flow of gas through the port is decreased. Upon passage of the enlarged portion out of and beyond the port, additional gas is allowed to flow through the port to dampen bubble oscillation to minimize secondary pressure pulses.

Keywords: Seismic explosive acoustic
transmitter; Towed vehicle

U.S. Cl. X.R. 181-5H



3,746,875
**ELECTRICAL POWER PLANT DRIVEN BY OCEAN
 WAVES AND TIDES**
 Joseph Donatelli, 2624 Mozart St., Los Angeles, Calif.
 Filed Aug. 4, 1972, Ser. No. 277,876
 Int. Cl. F03b 13/12

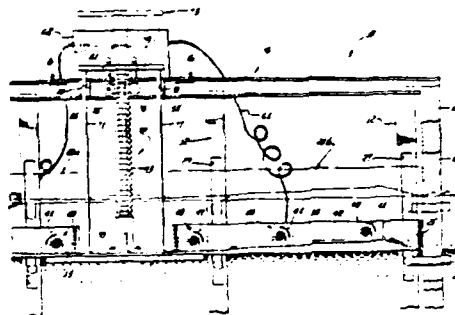
U.S. Cl. 290-42

10 Claims

A four-way power plant operable to generate electrical energy both from the up and down two-directional movement of the ocean surface and also from the two-directional flow of the ocean towards and away from a shore includes fixed structure mounted on the ocean floor and a floating platform slidably connected with the fixed structure. Electricity is generated from mechanism, preferably gears, driven by the up and down movement of the platform and from other mechanism, preferably paddle wheels, driven by the flow of water directed across the platform.

Keywords: Electrical generator; Offshore platform, fixed; Power, tide; Power, wave

U.S. Cl. X.R. 290-43; 290-53; 290-54; 417-330; 417-333



JULY 24, 1973

3,747,354
RETRACTABLE PIER
 Ray Marvin Macomber, Albion, Mich., assignor to Edwin A. Torrey, Albion, Mich., a part interest
 Filed June 16, 1971, Ser. No. 153,555
 Int. Cl. E02b 3/20

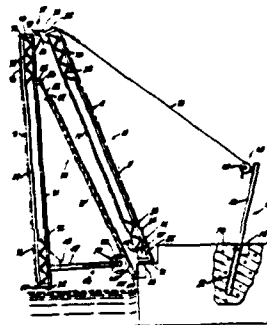
U.S. Cl. 61-48

11 Claims

A portable pier or landing dock is provided for use, for example at small lakes and private cottages, comprising a pair of pier members hingedly affixed to each other with the end of one pier member hingedly mounted with respect to ground. A cable is connected to the distal end of the latter hinged pier member and operated by winding on a winch mounted on a dead anchor mounted in the ground. In a preferred embodiment an adjustable leg is provided at the distal end of the second pier member having a water buoyant floatable roller at the end thereof. Additionally, in an improved embodiment, a thrust rod is provided pivotally mounted at one end at a point fixed with respect to the ground near the pivotal point of the first pier member, and pivotally connected at the other end to a point on the second pier member spaced outwardly from its hinged joint with the first pier member to form a suitable geometric pattern for facilitating the extension and launching of the second pier member.

Keywords: Pier, fixed; Pier, mobile; Small-craft pier

U.S. Cl. X.R. 14-71



3,747,693

DIESEL PILE DRIVER FOR IMPACT ATOMIZATION
Fritz Kummel, Esslingen, and Rudolf Hennecke, Buech-Grun-
bach, both of Germany, assignors to Debmag-Maschinen-
fabrik Reinhold Dornfeld, Esslingen, Germany

Filed Aug. 13, 1971, Ser. No. 171,524

Claims priority, application Germany, Aug. 18, 1970, P 20
40 924.9

Int. Cl. E02d 7/12

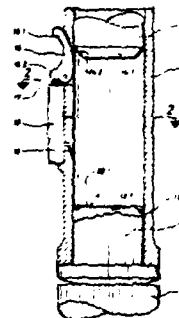
U.S. Cl. 173-128

2 Claims

A Diesel pile driver, in which a piston operable to impact upon the impact area of an impact member atomizes the fuel conveyed by a metering pump onto the impact area of the impact member, the impact surface of said piston and the impact area of said impact member which is adapted to receive the fuel from said metering pump respectively forming plane surfaces substantially parallel to each other.

Keywords: Pile driver, impact

U.S. Cl. X.R. 123-46SC; 123-46H; 173-137



3,747,760

METHOD OF RECOVERING OIL FROM A WATER SURFACE

Wendell Graydon Ekdahl, Martinsville, N.J., assignor to
Johns-Manville Corporation, New York, N.Y.

Filed Mar. 23, 1972, Ser. No. 237,419

Int. Cl. B01d 21/00

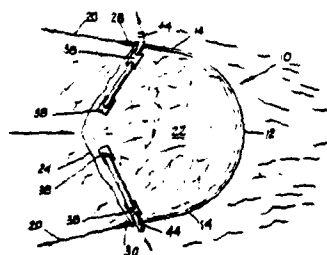
U.S. Cl. 210-84

2 Claims

A method for recovering oil from a water surface, wherein the water carrying the oil is flowing in a specific direction relative to a barrier, comprises containing the oil in the barrier to form a confined oil slick having a leading edge. Due to the flow of the water, a head-wave is formed along the leading edge of the confined oil slick and oil removal apparatus is located at the head-wave to remove oil from the head-wave.

Keywords: Pollutant collection; Pollutant, suction removal

U.S. Cl. X.R. 210-DIG.21



3,747,779
BOAT RAMP

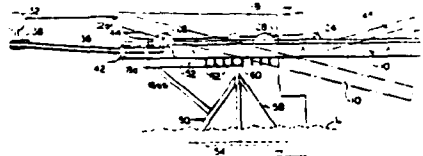
Paul L. Gross, Apt. 206 Lakeview Towers, Sebring, Fla.
Filed Nov. 4, 1971, Ser. No. 195,559
Int. Cl. B60p 1/04

Keywords: Small-craft launcher

U.S. Cl. 214-1 A

5 Claims

A boat ramp apparatus includes a framework ramp which is pivotable about the support axis provided by a separate portable support frame between an inclined position wherein a boat may be loaded or unloaded and a generally horizontal position wherein the boat may be stored elevated above the water. The support axis is formed by a transverse support bar, which enters between pairs of downwardly projecting rod-like stop members located along the underside of the ramp. The pivot axis of the ramp may be varied by simply lifting the ramp and moving it to a new position wherein the support axis engages between a different pair of stop members.



JULY 31, 1973

3,748,760
DREDGING MACHINERY WITH SWINGING DOUBLE
ENDED SCOOP

Ludwig Lorenz Schnell, Aufhausen, Germany, assignor to
Schuttgutforderlechnik AG, Zug/Schweiz, Switzerland
Filed Dec. 14, 1971, Ser. No. 207,923
Claims priority, application Germany, Dec. 28, 1970, P 20
63 968.3

Keywords: Dredge, suction; Dredge intake;
Dredge ladder control

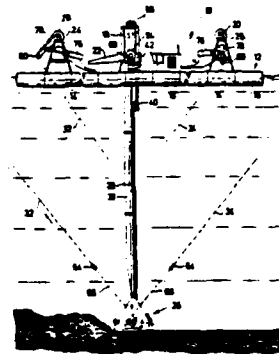
U.S. Cl. X.R. 37-71

Int. Cl. E02f 3/92

U.S. Cl. 37-58

10 Claims

A floating dredge has a downwardly extending discharge line terminating in a double ended scoop, with the discharge line being supported at its upper end for bi-directional swinging movement of the scoop; the scoop having a pivoted double ended scraper blade which alternatively opens one end of the scoop while closing the other.



3,748,863
CONNECTION FOR A NONMETALLIC FOUNDATION
PILE

Ivo C. Pogonowski; Paul D. Carmichael, and Edward E. Bodor,
all of Houston, Tex., assignors to Texaco Inc., New York,
N.Y.

Filed Jan. 19, 1972, Ser. No. 218,877
Int. Cl. E02d 5/22; F16l 25/00

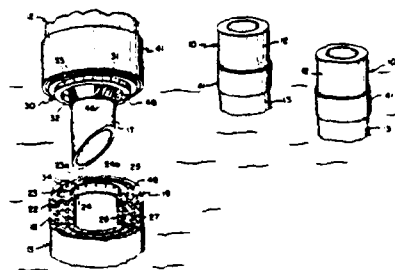
U.S. Cl. 61-53

3 Claims

The invention relates to a pile or foundation member particularly adapted for use in offshore or similar applications, wherein a hostile environment or a severe corrosion problem is a pertinent factor. The pile comprises an elongated member formed essentially of a series of reinforced concrete pile sections. A metallic cap carried at each pile section end is adapted to engage and be fixed to a corresponding cap on the next succeeding pile end whereby to define a rigid interface connection between the two. The metal joint thus formed between the concrete sections is then isolated from its surroundings by means of an encapsulating or enclosing barrier formed on the pile whereby to be protected from the environment.

Keywords: Coating; Corrosion prevention; Pile, concrete; Pile section connection

U.S. Cl. X.R. 61-56; 285-294; 285-331;
285-404



3,748,899
CONDUCTIVITY AND TEMPERATURE SENSING PROBE
Michael C. Gregg, La Jolla, and Charles S. Cox, Del Mar, both
of Calif., assignors to The United States of America as
represented by the Secretary of the Navy, Washington, D.C.

Filed June 12, 1972, Ser. No. 261,766
Int. Cl. G01d 1/16

U.S. Cl. 73-170 A

6 Claims

A probe-like casing is provided interiorly with a chamber having a small orifice permitting ocean water to flow into the chamber reservoir. Conductivity is sensed by separate pairs of electrodes mounted interiorly and exteriorly of the chamber. One of these pairs, the driving electrodes, apply a constant amplitude square wave electrical current across the opening while the other pair of electrodes, the sensing electrodes, measure voltage variations across the opening produced by variations in the electrical conductivity of the ocean water in the opening. Suitable means are mounted in the casing to exert a positive suction force capable of continuously drawing the ocean water at a controlled flow rate through the opening. The probe falls freely through the ocean to constantly draw in ocean water. The voltage variations sensed by the sensing electrodes are directly related to variations in the electrical resistance of the water drawn into the hole. Since variations in electrical resistance are due both to variations in temperature and electrolyte concentration, a thermistor is mounted near the orifice or opening into the chamber so as to constantly sense temperature variations present in the same volume of water that is producing the electrical resistance variations. These simultaneous measurements determine the variation in electrolyte concentration.

Keywords: Bathythermograph; Instrument deployment; Salinity measurement

U.S. Cl. X.R. 324-30B



3,749,667
DISPOSAL OF OIL SPILL AT SEA
Olle B. Lindstrom, Lorensviksvagen 14,
Taby, Sweden

No Drawing, Filed Nov. 18, 1971, Ser. No. 200,162
Claims priority, application Sweden, July 9, 1971,
8,899/71
Int. Cl. E02b 15/04

U.S. Cl. 210—36

8 Claims

Method for disposing of oil spilled at sea by first burning the oil and thereafter applying an inorganic sinking agent. The sinking agent particles, less than 50 mm. in size, are dispersed over the burning oil and become coated with the oil residue which is absorbed onto the particles as they sink. The sinking agent particles may be sand, gravel, chalk, gypsum, slag of heavy materials like iron ore, and the like.

Keywords: Pollutant burning; Pollutant absorption

U.S. Cl. X.R. 210-40; 210-63; 210-DIG.21;
431-2

No Figure

3,750,097
COMPRESSED GAS SEISMIC ENERGY GENERATOR
John J. Havlik, and Billy H. Towell, both of Houston, Tex., as-
signors to Texaco Inc., New York, N.Y.

Filed July 8, 1971, Ser. No. 160,693
Int. Cl. H04b 13/00

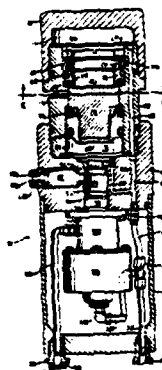
U.S. Cl. 340—12 R

14 Claims

A compressed gas gun for generating a seismic pulse in water. It has a floating-action piston controlled by an auxiliary piston for releasing a compressed gas charge suddenly. It also shapes the discharge gas pattern in the water to reduce secondary bubble pulse action.

Keywords: Seismic explosive acoustic transmitter

U.S. Cl. X.R. 181-.5H



AUGUST 3, 1973

3,750,408

**PROCESS FOR THE CONTINUOUS DREDGING OF
INCOHERENT MATERIAL, PARTICULARLY SANDY
MATERIAL, WITH A CIRCULAR PATH**

Willem Cornelis den Hartog, Kinderdijk, Netherlands, as-
signor to N. V. Industriële Handelscombinatie Holland,
Kinderdijk, Netherlands

Filed Apr. 16, 1971, Ser. No. 134,654
Int. Cl. E02f 1/00; E02d 17/16

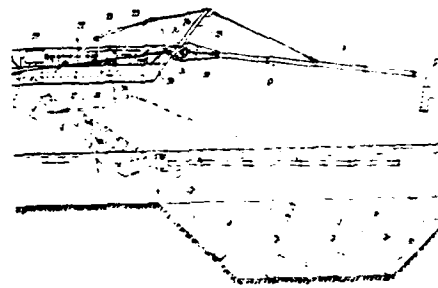
U.S. Cl. 61-2

2 Claims

A process for the continuous dredging of incoherent material, particularly sandy material, with a circular path, including the steps of drawing continuously the incoherent material from a zone where it is brought and conveying, also continuously, said material to an erosion zone, to such an amount as to integrate the same erosion. The drawing is carried out progressively in a zone having the shape of an annular ring, the size of which is such, in relationship with the supply of incoherent material, that at the end of a complete turn of the dredging unit, the initial point will be carried again to its initial level. A device is also disclosed for carrying out the process, comprising a drawing pipe, carried by an arm glidingly mounted on a circular guide, for instance a rail located on a landing stage, hydraulic means for turning said drawing pipe about a horizontal shaft, and a pump suitable to cause the water + sand mud to be drawn by said tube and to be conveyed through trunk line, provided with a knuckle joint coincident with the centre of rotation of the arm and connected to a pipe leading to the delivery zone.

Keywords: Dredge, suction; Dredge-spoil transport

U.S. Cl. X.R. 37-58; 37-65



3,750,412

**METHOD OF FORMING AND MAINTAINING OFFSHORE
ICE STRUCTURES**

John L. Fitch, and Lloyd G. Jones, both of Dallas, Tex., as-
signors to Mobil Oil Corporation, New York, N.Y.

Filed Oct. 19, 1970, Ser. No. 81,940
Int. Cl. F25c 1/02

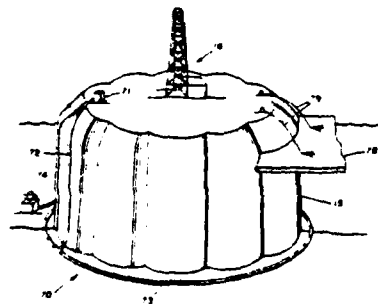
U.S. Cl. 61-46

7 Claims

The specification discloses a method of constructing and maintaining an ice structure at a desired, frigid, offshore location which can be used for drilling and/or producing oil wells. An ice floe or a part of a fast ice mass forms the base on which ice is accumulated to form the structure. The ice can be accumulated by spraying, flooding, or piling up of ice. The structure may be reinforced and has means to protect it from marginal melting during the "summer" months.

Keywords: Offshore construction; Offshore island; Ice structure

U.S. Cl. X.R. 61-63; 62-1; 62-64; 62-259



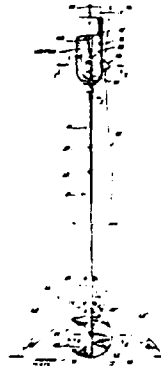
3,750,609
**POWERFUL THRUSTER METHOD AND APPARATUS
 SUITABLE FOR DRIVING A MEMBER SUCH AS AN
 ANCHOR OR PILE INTO THE EARTH, AND ANCHORING
 AND PILE APPARATUS**

Stephen V. Chelminski, West Redding, Conn., assignor to Bolt Associates, Inc., Norwalk, Conn.
 Division of Ser. No. 799,449, Feb. 14, 1969, Pat. No. 3,604,519. This application Aug. 28, 1970, Ser. No. 67,953
 Int. Cl. B63b 21/28

Keywords: Embedment anchor

U.S. Cl. 114—206 A 8 Claims

A novel thruster method and apparatus generating a sequence of powerful thrusts suitable for driving an anchor, a pile, or the like into the earth. A novel anchor, anchor placing apparatus and pile driver are described. An acoustic impulse repeater device is located within a reaction barrel to rapidly upwardly impel water therefrom. In the case of the anchor placing apparatus the reaction of the barrel rams an anchor and the anchor chain attached to it into sediment below a body of water. In the pile driver embodiment, the pile has taken the shape of the reaction barrel into which water is placed. Various embodiments are described.



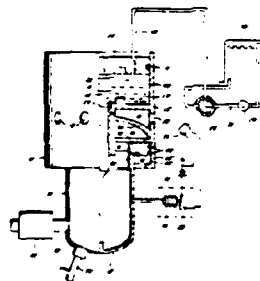
3,750,837
**EXPLOSIVE SEISMIC ENERGY SOURCE WITH QUICK
 RELEASE VALVE**

Charles D. Wood, San Antonio, Tex., assignor to Southwest Research Institute, San Antonio, Tex.
 Filed Feb. 8, 1972, Ser. No. 224,522
 Int. Cl. G01v 1/02; H04b 13/00

Keywords: Seismic explosive acoustic transmitter

U.S. Cl. 181—5 H 8 Claims

An apparatus for generating acoustical pulses in water by burning a fuel and air in a combustion chamber and releasing the explosive gases through an improved fast-acting valve to produce a seismic shock. A valve block opening and closing the combustion chamber with an actuator holding the valve block closed against the combustion chamber pressure by pressurized hydraulic fluid which when released allows the actuator to move away from the valve block and suddenly strike and move the valve seat block off of the combustion chamber outlet. The inertia of the actuator being larger than the valve block to provide quick opening. The hydraulic control fluid being spaced from the combustion chamber to avoid heating and fouling. Providing metal to metal seal contact means between the valve seat block and the chamber outlet and with the actuator providing an improved ignition by inserting hot compressed air at a temperature of about 750°F into the chamber and thereafter spraying fuel therein thereby eliminating the need for a spark or glow plug ignition source.



AUGUST 14, 1973

3,751,925

FLOATING OIL CONTAINMENT BOOM

Robert K. Thurman, Linwood, Wash., assignor to Merritt Division of Murphy Pacific Marine Salvage Company, New York, N.Y.

Filed Oct. 7, 1970, Ser. No. 78,801

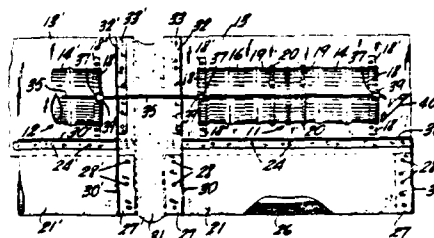
Int. Cl. E02b 15/04

U.S. Cl. 61-1 F

9 Claims

A floating boom for containing oil and the like spilled on a body of water comprises a plurality of interconnected, floating units each supporting a rigid vertical barrier with a part above water and a part submerged. The barriers are interconnected by panels of flexible waterproof material of substantially the same vertical extent as the barriers and both the barriers and the interconnecting panels have flexible, waterproof skirt portions depending below the barriers. Each of the units is secured to a tow line by means of which the boom may be towed to a desired location and there anchored in place.

Keywords: Pollutant, surface barrier



3,751,927

APPARATUS FOR ENTRENCHING SUBMERGED ELONGATE STRUCTURES

Joseph Charles Perot, Jr., Natchitoches, La., assignor to Brown & Root, Inc., Houston, Tex.

Filed Feb. 22, 1972, Ser. No. 227,844

Int. Cl. E02f 5/02; F16l 1/00

U.S. Cl. 61-72.4

19 Claims

An apparatus for entrenching submerged elongated structures such as pipelines and the like, including a skid frame having port and starboard pontoon runners with a box frame operable to bridge the pontoon runners over a pipeline to be entrenched. The box frame includes a first and second set of upper and lower pontoon spanning supports. Each of the supports includes inwardly facing port and starboard guide rails. Vertically and horizontally adjustable port and starboard cutter and eductor heads are rigidly supported from the box frame guide rails and extend in close proximity to the surfaces of a pipeline to be entrenched. The port and starboard cutter and eductor heads both have a generally vertical-slant-vertical configuration so that the cutter and eductor heads extend along the lateral surfaces of the pipeline, slope beneath the pipeline and extend vertically beneath the pipeline. The head configuration enables the apparatus to rapidly and efficiently cut a trench having generally vertical side walls within the bed of the body of water and educt the loosened soil or detritus material to permit the pipeline to descend within a narrow walled trench within the bed of the body of water.

Keywords: Dredge, cutterhead; Seabed pipeline placement; Seabed trencher

U.S. Cl. X.R. 37-63

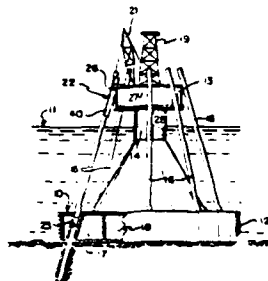


3,751,930
**ARTICULATED MARINE STRUCTURE WITH
 PREPOSITIONED ANCHORING PILES**
 George E. Mott, and James P. Wilbourn, New Orleans, La., as-
 signors to Texaco Inc., New York, N.Y.
 Filed Dec. 27, 1971, Ser. No. 212,074
 Int. Cl. E02b 17/00; E02d 11/00
 U.S. Cl. 61-46.5 2 Claims

The invention relates to a marine structure for use in an offshore body of water where piling is required to hold the structure in place. It relates in particular to a floatable marine structure which is sufficiently buoyant to be floated to an offshore working site carrying a plurality of positioning piles thereon. At the site at least a part of the structure is ballasted to sink to the ocean floor, the prepositioned piles are thereafter sequentially driven into the substratum.

Keywords: Offshore construction; Offshore platform, fixed; Pile driver leads; Pile placement; Seabed foundation

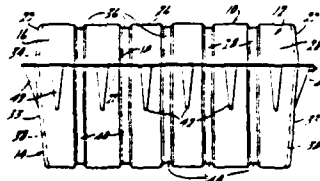
U.S. Cl. X.R. 61-53.5; 173-43



3,752,102
**FLOATING DOCK OR THE LIKE AND FLOATATION
 UNIT FOR USE THEREWITH**
 Robert A. Shuman, Plymouth, Mich., assignor to Woodall In-
 dustries Inc., East Detroit, Mich.
 Filed Sept. 22, 1971, Ser. No. 152,744
 Int. Cl. B63b 35/00
 U.S. Cl. 114-5 F 14 Claims

A floating dock, raft or the like is made with special plastic floatation units. The floatation units consist of a pair of vacuum formed polyethylene sheets heat sealed together at peripheral flanges thereof. This flange is nailed to the bottom of joists which support the deck material of the dock.

Keywords: Pier, floating; Small-craft pier



3,752,317

OIL RECOVERY VESSEL

Eric E. Lithen, Garden City, N.Y., assignor to Oil Recovery Systems, Inc., Mineola, N.Y.

Filed Nov. 10, 1971, Ser. No. 197,248

Int. Cl. E02b 15/04

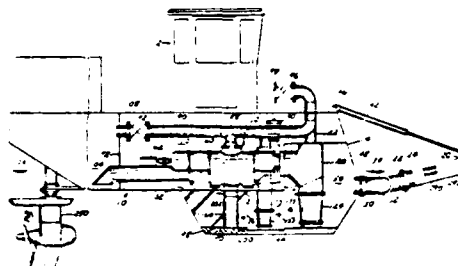
U.S. Cl. 210—242

3 Claims

A vessel for collection and salvage of oil spills having a vertically adjustable forward-mounted scoop from which fluid collected under the action of gravity and the forward motion of the vessel is directed through conduits into submerged separation tanks under conditions of laminar flow. In the submerged tanks, the fluid is separated into oil, which is transferred to storage tanks, and water which is discharged.

Keywords: Pollutant collection; Pollutant removal watercraft; Pollutant, suction removal; Pump

U.S. Cl. X.R. 210-DIG.21



AUGUST 21, 1973

3,753,354

CORROSION-PROTECTED ANCHORING RODS FOR ANCHORING STRUCTURAL PARTS IN THE EARTH, AS WELL AS METHOD OF PRODUCING ANCHORINGS WITH CORROSION-PROTECTED ANCHOR RODS

Karlheinz Bauer, 8898 Willelsbacherstr. 5, Schrebenhausen/Obb., Germany

Filed Mar. 31, 1971, Ser. No. 129,715

Claims priority, application Germany, Jan. 12, 1971, P 21 01 236.2

Int. Cl. E02d 5/74, 17/04

U.S. Cl. 61—35

4 Claims

A corrosion-protected anchoring rod for the anchoring of structural parts in the earth is adapted to be placed in a bore hole formed in the earth, with the rod consisting of a force transmission section adjacent the opening of the bore hole, and a force introduction section adjacent the end of the anchoring rod disposed furthest in the hole. The force transmission section of the rod is covered with a smooth, corrosion-preventing covering, while the force introduction section is also covered with a corrosion-preventing covering having a corrugated profile in order to increase the frictional resistance between the anchoring rod and the surrounding soil. The corrosion-prevented coverings of the anchoring rod are suitably joined to completely enclose the anchoring rod, and a bonding composition is provided in the space between the corrugated covering and the tension member.

Keywords: Bulkhead; Corrosion prevention; Grouting

U.S. Cl. X.R. 57-725; 61-39; 61-45 B



3,753,355
LIFTING DRY DOCK

Glen C. Knoch, Lake Ozark, Mo.

Filed Dec. 2, 1971, Ser. No. 204,272

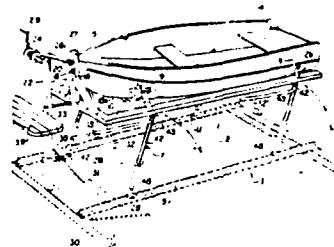
Int. Cl. B63c 1/02

U.S. Cl. 61-65

5 Claims

A lifting dry dock for lifting a boat out of the water comprising a subsurface support, a cradle for cradling the boat, and a plurality of legs pivotally connecting the cradle to the subsurface support in a manner which permits movement of the cradle between a lowered position in which the cradle is below the surface of the water a distance sufficient to permit the boat to float thereover and a raised position in which the cradle is clear of the water. A winch is provided for effecting movement of the cradle between its lowered position and its raised position.

Keywords: Small-craft service structure



3,753,494
UNDER-SEA OIL STORAGE INSTALLATION
Hiroshi Hirata, 15-30 2-chome Sanno, Ota-ku, Tokyo, Japan
Filed Sept. 14, 1971, Ser. No. 180,293
Claims priority, application Japan, Dec. 15, 1970,
45/111157

Int. Cl. E02b 15/04

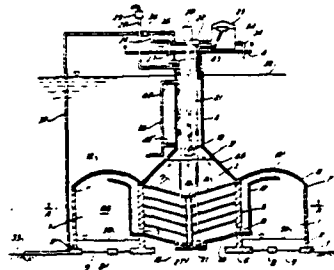
U.S. Cl. 210-170

15 Claims

An installation including first and second storage tanks supported on the sea bottom; the second or external tank may be annular in shape and surround the first, or internal tank. Means are provided for introducing oil into and removing oil from the upper part of the internal tank, and conduit means establish communication between the lower part of the internal tank and the upper part of the external tank. The external tank has openings at its bottom through which it communicates with the sea, and a roof having an arched cross-sectional shape. The outer wall of the internal tank may form the inner wall of the external tank and support a hollow shaft extending above the sea surface, the shaft carrying an equipment-supporting platform. Within the internal tank is a sludge-gathering means, which may be perforated plates or netting, for directing sludge into a deposit tank. Means are provided for agitating the sludge preparatory to its being pumped out of the deposit tank.

Keywords: Offshore storage tank, emergent

U.S. Cl. X.R. 114-.5T



3,753,496
**CONVERGING VORTEX APPARATUS FOR SEPARATING
 OIL FROM WATER**

Edward A. Boyd, San Diego, Calif.

Filed Dec. 20, 1971, Ser. No. 209,835

Int. Cl. E02b 15/04

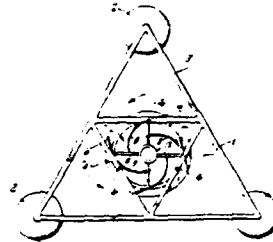
U.S. Cl. 210-242

5 Claims

A vortex generator in the form of a funnel-shaped casing is submerged with its upper edge or lip portion in close proximity to an oil slick. A plurality of vanes carried by the casing induce a rotary motion in fluids passing through the casing. A suction pump creates the flow by drawing a mixture of water and oil through the casing, the mixture then being carried by a conduit to a nearby tank or reservoir where it can be separated.

Keywords: Pollutant, suction removal

U.S. Cl. X.R. 210-DIG.21; 210-304



3,753,497
POLLUTION SKIMMER
 Benedict J. Hoffman, 2230 Chestnut St., Fort Wayne, Ind.

Filed June 10, 1971, Ser. No. 151,699

Int. Cl. E02b 15/04

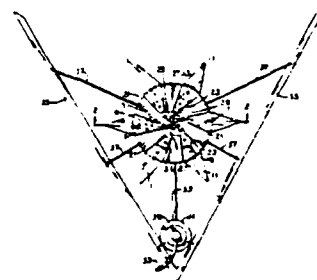
U.S. Cl. 210-242

6 Claims

A skimmer for removing supernatant matter such as oil from a liquid such as water is disclosed having a base portion containing a centrally located drain and a plurality of troughs extending outwardly laterally from the drain but somewhat skewed relative to radii from the drain to aid in the formation of a vortex within the drain. The base portion is supported by a like plurality of laterally extending wings each having a density less than that of the liquid and each independently adjustably affixed to the base portion so that the elevation of the base portion relative to the liquid surface may be varied. A drain tube is connected to the lower end of the drain and after passing through a pump discharges the matter which is entering the drain into a surface material receptacle which may be a multiple outlet container for separating immiscible liquids. A V-shaped weir partially surrounding the base and wings and mechanically connected thereto may be provided for use if the skimmer in flowing liquids and the skimmer, weir and pump may all be mechanically interconnected so as to float as a unit.

Keywords: Pollutant collection; Pollutant, suction removal

U.S. Cl. X.R. 210-DIG.21



AUGUST 28, 1973

3,754,403

OFFSHORE MARINE STRUCTURE EMBODYING
ANCHOR PILE MEANS

George E. Mott, Metairie, and James P. Wilbourn, New Orleans, both of La., assignors to Texaco Inc., New York, N.Y.
Filed Feb. 9, 1972, Ser. No. 224,734
Int. Cl. E02b 17/00; E02d 11/00

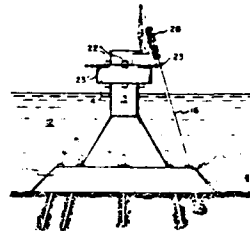
U.S. Cl. 61-46.5

8 Claims

The invention relates to a buoyant marine structure as would be found, or is usable in a body of water which lies above a penetrable substratum. The structure is comprised of several operably connected components and is controllably buoyant as to be floated or propelled to a proposed working site. Thereafter, the buoyancy is regulated to sink the hull portion of the structure to a resting place on the ocean floor. A series of anchoring piles are carried on the structure in such manner that they can be readily released from a fixed position to enter the penetrable substratum, and thereafter be driven to a desired depth.

Keywords: Offshore construction; Offshore platform, fixed; Pile driver leads; Pile placement; Seabed foundation

U.S. Cl. X.R. 61-53.5; 173-43



3,754,439

OCEANOLOGICAL AND METEOROLOGICAL STATION
Peter Bauer, Bremen, Germany, assignor to Erno Raumfahrt-
technik GmbH, Bremen, Germany

Filed Aug. 2, 1971, Ser. No. 167,999

Claims priority, application Germany, Aug. 5, 1970, P 20 38
870.9

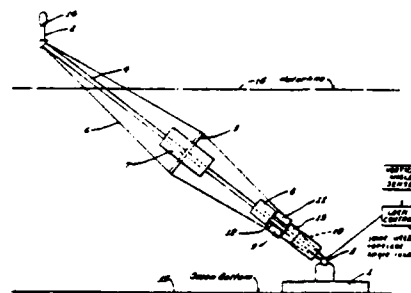
Int. Cl. G01v 9/00; G01w 1/00

U.S. Cl. 73-170 A

5 Claims

Equipment establishing a station for providing for oceanological and meteorological measurements in the continental shelf region and in similar, shallow parts of the ocean, and having a base anchoring the station to the bottom of the ocean, a mast pivotally linked to the base for up and down pivoting as well as for turning on a vertical axis; and variable buoyancy is provided at the mast above the point of pivoting. Instrumentation, including sensing means for taking oceanological and meteorological readings as well as a radio receiver transmitter and a controller are disposed on top of the mast.

Keywords: Buoy, instrumented; Buoy mooring system; Instrument deployment



3,754,653

**APPARATUS AND METHOD FOR COLLECTION OF OIL
FROM SURFACE OF THE SEA**

Sam M. Verdin, 2600 Breton Dr., Marrero, La.

Continuation-in-part of Ser. No. 46,963, June 17, 1970,
abandoned. This application Apr. 21, 1971, Ser. No. 136,147

Int. Cl. B01d 21/00; E02b 15/04

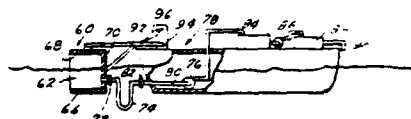
U.S. Cl. 210-197

6 Claims

An oil spill on the surface of the sea is collected by means of a funnel-like scoop which is moved horizontally through the water in a direction such that oil and sea water, including waves, flow into the open end of the scoop. An oil-rich mixture flows over a weir located at the apex end of the scoop and the water is returned to the sea after separation of the oil. The trim of the scoop is adjusted by ballast tanks.

Keywords: Pollutant collection; Pollutant removal watercraft; Pollutant, suction removal

U.S. Cl. X.R. 210-DIG.21; 210-242



3,755,189
**COMPOSITION FOR THE CONTROL OF OILS
FLOATING ON WATER**

Ralph E. Gilchrist, and Jack C. Cox, both of Houston, Tex., as-
signors to Tenneco Oil Company, Houston, Tex.

Filed Sept. 24, 1971, Ser. No. 183,620

Int. Cl. B01j 13/00

U.S. Cl. 252-316

4 Claims

A composition of matter suitable for the confinement of oil floating on water consisting essentially of a drying oil, a carrier selected from the class consisting of liquid alcohols, ketones and ethers, and a water insoluble metallic soap catalyst. The composition is used to control oil slicks on water by dispersing said composition on the surface of the slick in an amount sufficient to confine the oil slick and thereby allow removal thereof.

Keywords: Pollutant coalescence

U.S. Cl. X.R. 106-252; 106-253; 106-264;
210-42; 210-DIG.21

No Figure

SEPTEMBER 4, 1973

3,755,932

JACK-UP DREDGE

Neil H. Cargile, Jr., c/o American Marine & Machinery Co.,
P.O. Box 1067, Nashville, Tenn.

Filed June 23, 1971, Ser. No. 155,934

Int. Cl. E02f 3/88

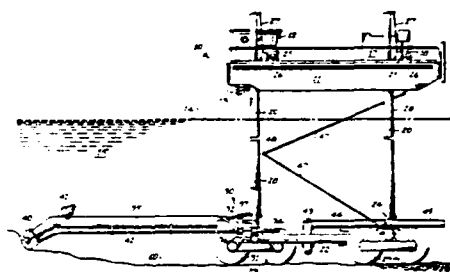
U.S. Cl. 37-67

1 Claim

A dredge having a hull connected to a mobile platform by vertically extendable and retractable legs so that the mobile platform can be lowered to engage and move over the bottom of a body of water, and further so that the hull can be jacked-up above the surface of the water after the platform has engaged the bottom. Mounted upon the platform for operative engagement with the bottom is the dredging tool, such as a rotary cutter head, which may be mounted on the outer extremity of a ladder swingably mounted at its inner end to the platform. The hull is adapted to be propelled on the surface of the water when the platform is retracted, and is also adapted to support personnel and the controls for the operation of the dredge. A separate propulsion means is provided for moving the platform along the bottom.

Keywords: Dredge, cutterhead; Dredge ladder control; Dredge propulsion; Dredge, submerged; Pump

U.S. Cl. X.R. 37-56; 61-46.5



3,756,031

SELF-RIGHTING FLOATING BOOMS

Millard F. Smith, 2 Harding Ln., Westport, and Anthony V. Anusackas, Fairfield, both of Conn., assignors to said Smith, by said Anusackas

Continuation-in-part of Ser. No. 815,663, April 14, 1969. This application July 21, 1971, Ser. No. 164,606

Int. Cl. E02b 15/04; A44b 17/00; B32b 17/10

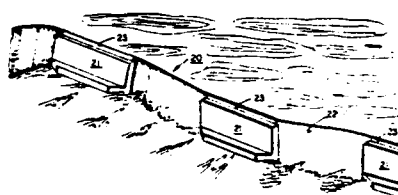
U.S. Cl. 61-1 F

11 Claims

A unique self-righting and quickly deployable floating boom capable of enduring strong winds and waves comprises a series of polymer floats each incorporating a horizontally extending shelf securely attached at spaced intervals to an integral composite fin of vinyl sheet reinforced by woven polyester fibers incorporating an interwoven core of two characteristically different fibers that provide the vinyl sheet with different vertical and horizontal flexing capabilities. An extension shelf formed on each of the polymer floats provides the boom with additional buoyancy while also serving as a barrier effectively containing oil and other floating materials despite wind, choppy water and strong waves. Furthermore, the extension shelves incorporate fore and aft lifting surfaces which tend to induce "planing" and counteract the forces which tend to draw the floating boom beneath the water surface during fast end-wise deployment. The dual fiber core of the vinyl sheet is manufactured with relatively thin horizontal fibers interwoven with relatively stiff, thick vertical fibers to allow the vinyl sheet to flex easily about vertical flexing axes while strongly resisting horizontal flexing about horizontal flexing axes.

Keywords: Pollutant, surface barrier

U.S. Cl. X.R. 24-201; 114-.5F; 161-84



3,756,032

SLUICEGATE STRUCTURE

Ludovico Solinas, Bologna, Italy, assignor to Riva Calzoni S.p.A., Bologna, Italy

Filed Mar. 10, 1971, Ser. No. 122,737

Int. Cl. E02b 7/42

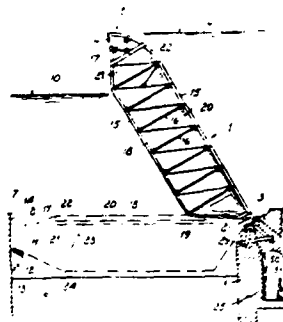
U.S. Cl. 61-25

4 Claims

Sluice gate of the flap type to dam large canals or access openings of internal basins, for example to dam the accesses of lagoons to the open sea and comprises hinged hollow elements which can be flooded with water to cause sinking into a recess, or floated by means of compressed air thus forming a barrage.

Keywords: Channel barrier; Tidal estuary water level; Tidal inlet

U.S. Cl. X.R. 61-8



3,756,033

OFFSHORE STRUCTURE WITH ROTATING AND INDEXING MECHANISM FOR PLACING PILES

Frederick Horace Kouka, Western Springs, Ill., assignor to Chicago Bridge & Iron Company, Oak Brook, Ill.

Filed Nov. 12, 1971, Ser. No. 198,341

Int. Cl. E02b 17/00; B63b 35/44

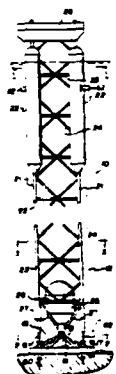
U.S. Cl. 61-46.5

9 Claims

An offshore structure having a base resting on a sea floor, a plurality of vertical pile-receiving sleeves in the base, an elongated rigid vertical member joined to the base by a connection which permits angular pivotal displacement and rotation of the vertical member, and at least one vertical pile-guiding means positioned on the vertical member to be axially alignable with a plurality of the vertical pile-receiving sleeves on an individual sleeve basis upon rotation of the vertical member about its vertical axis.

Keywords: Offshore construction; Offshore platform anchor; Offshore platform, floating; Pile placement

U.S. Cl. X.R. 61-50; 61-53.5



346

3,756,294

UNDERWATER LEAKAGE OIL COLLECTOR SYSTEM

Don E. Rainey, 3209 N.E. 10th St., Pompano Beach, Fla.

Continuation of Ser. No. 124,827, March 16, 1971,

abandoned. This application Sept. 5, 1972, Ser. No. 286,356

Int. Cl. B65b 3/04

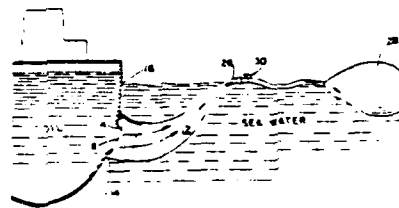
U.S. Cl. 141-392

6 Claims

Apparatus for collecting oil at its source of leakage from a container underwater which includes an elongated, flexible and impervious conduit having an inverted channel-shaped mouth composed of cushioned sealing material and flexible magnet means for mating engagement with the surface of the oil container surrounding the sides and upper portion of the source of leakage for entrapping the oil and elevated conveying means at the opposed end of the conduit for directing the entrapped oil to a collector. The bottom portion of the mouth remains open to permit entry of water into the conduit to float the entrapped oil and accelerate its passage upwardly through the conduit.

Keywords: Pollutant collection; Pollutant, submerged barrier

U.S. Cl. X.R. 61-68; 61-72.3; 137-312



3,756,414

OIL SKIMMER MODULE

Angelo J. Crisafulli, c/o The Crisafulli Pump Co., Inc., Box 1051, Glendale, Mont.

Filed May 11, 1971, Ser. No. 142,282

Int. Cl. E02b 15/04

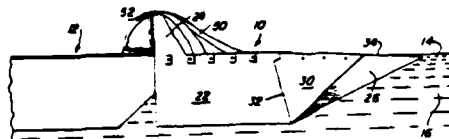
U.S. Cl. 210-242

4 Claims

A skimmer for removal of a layer of oil or other floating pollutant from the surface of a body of water constructed in the form of a module employed with a desired number of similar modules for connection with a floating barge or other vessel for collecting and skimming off the oil when the barge or other vessel moves forwardly and discharging the collected oil or pollutant into storage tanks or the like incorporated into the barge or other vessel. Each oil skimmer module includes an open front receptacle having a horizontally disposed inclined front edge defining a weir that is capable of being raised or lowered for varying the depth of the weir in relation to the surface of the body of water. Each module also includes a pump for removing water and pollutants collected in the receptacle and discharging them into a suitable storage area such as settling tanks or the like on the barge or other vessel.

Keywords: Pollutant removal watercraft; Pollutant, suction removal

U.S. Cl. X.R. 210-DIG.21



3,756,659

SUCTION DREDGING INSTALLATION

Jan de Koning, Amsterdam, Netherlands, assignor to N. V. Ingenieursbureau voor Systemen en Octrooien "Spanstaal", Rotterdam, Netherlands

Filed Oct. 7, 1968, Ser. No. 765,421

Claims priority, application Netherlands, Oct. 16, 1967, 6714009

Int. Cl. B65g 53/30

U.S. Cl. 302-15

9 Claims

In a suction dredging installation comprising a suction pipe which is connected to a pump and which has a suction mouth at its end and a throat between the pump and the suction mouth, in which the nominal flow section of the suction pipe has substantially a same value from the throat to the pump, whereas the flow section of the suction mouth is larger than said nominal flow section, the part of the suction pipe with the nominal flow section at the location of the throat is provided with a collar extending radially outwards, while the part of the suction pipe extending from the suction mouth to the throat has substantially the large flow section of the suction mouth. This shape of the suction pipe results in a toroidal supporting vortex arising before the throat which considerably reduces flow resistance

Keywords: Dredge, suction; Dredge intake



3,757,287

SEA BOTTOM CLASSIFIER

Jesse L. Bealor, Jr., Panama City, Fla., assignor to The United States of America as represented by the Secretary of the Navy

Filed Apr. 6, 1972, Ser. No. 241,634

Int. Cl. G01s 9/06

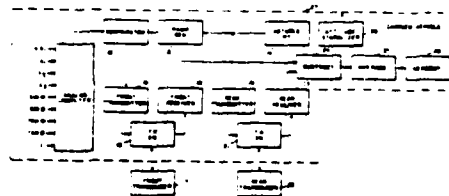
U.S. Cl. 340-3 R

18 Claims

A sea bottom classifier is disclosed as including a first transmitter and transducer for broadcasting sonic signals with a predetermined directivity pattern toward the sea bottom at a given first grazing angle and a second transmitter and transducer for broadcasting sonic signals with a predetermined directivity pattern toward said sea bottom at a second grazing angle that is different from said first grazing angle. A pair of receivers receive the echoes of said sonic signals after they have been reflected from the sea bottom, and data processing and computer systems are employed to time the aforesaid first and second broadcasting of sonic signals in such manner that the echoes thereof are reflected from the same spot on said sea bottom and subsequently simultaneously received by said pair of receivers, regardless of the distance said transducers are from said sea bottom or the relative velocity therebetween. A subtract circuit and a signal averaging circuit are employed to smooth the output signals from said receivers, and a readout, preferably calibrated in terms of sea bottom hardness and composition, is employed to indicate and/or record the sea bottom characteristics being sampled at any given instant.

Keywords: Seabed property measurement; Sonar, depth sounder

U.S. Cl. X.R. 340-3T



SEPTEMBER 11, 1973

3,757,369

PIPELINE WITH FLOATS

Johannes Bertus Laarman, Zwijndrecht, Netherlands, assignor to N.V. Industriële Handelscombinatie, Holland, Rotterdam, Netherlands

Filed Jan. 17, 1972, Ser. No. 219,207

Claims priority, application Netherlands, Jan. 18, 1971, 7100651

Int. Cl. B63c 7/08, B63b 21/52

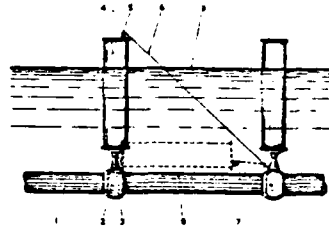
U.S. Cl. 9-8 R

6 Claims

A pipeline is supported in the water by slender upright floats that are articulated to the pipeline. Each float carries a water-proof winch at its upper end that is connected by a cable to a point on the pipeline at least as far away from the associated float as the height of the associated float. When the winch is operated, the float is drawn down toward a horizontal position thereby to raise the pipeline.

Keywords: Dredge pipe

U.S. Cl. X.R. 114-52



3,757,438

BULLDOZER FOR UNDERWATER OPERATIONS

Mark Yoshio Watase, 1605 Kanaolu St., Honolulu, Hawaii

Filed Dec. 9, 1970, Ser. No. 96,408

Int. Cl. E02f 5/00

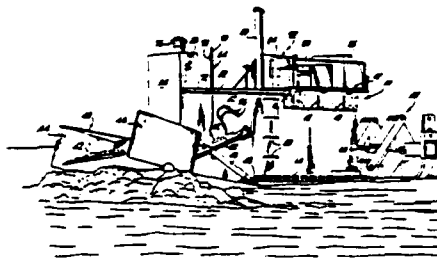
U.S. Cl. 37-54

1 Claim

A bulldozer adapted to carry out operations on ground which is submerged beneath water. The existing frame and belly guard of a conventional bulldozer are interconnected so as to form a watertight enclosure in which the engine and additional components are housed. At the upper part of the enclosure is a support for the operator and the various controls are accessible to the operator at the upper part of the enclosure. All liquid-holding tanks are located at an elevation sufficiently high to prevent flooding thereof, and the intake and exhaust of the engine also extend to an elevation high enough to maintain them out of water in which the entire bulldozer is situated during underwater operations.

Keywords: Seabed grader

U.S. Cl. X.R. 172-801



3,757,526

FLOATING BOOM STRUCTURES

Erik Johan Larsson, Gamleby, Sweden, assignor to Barracuda-verken AB, Gamleby, Sweden

Filed Oct. 30, 1972, Ser. No. 301,720

Claims priority, application Sweden, Nov. 4, 1971, 14097/71

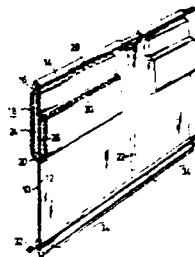
Int. Cl. E02b 15/04

U.S. Cl. 61-1 F

7 Claims

An oil boom comprising an elongate screen of plastics foil material provided with buoyant bodies and weights to hold the boom in a substantially vertical position when afloat in the water, with a portion of the upper edge portion of the boom above the surface of said water. The boom comprises two superimposed sheets of plastics foil material which are welded together at a number of sequentially arranged points in the longitudinal direction of the boom to form substantially rectangular closed pockets located on the upper half of the boom in its position of use. Each pocket contains one filling body which extends the pocket to form a buoyant body of requisite buoyancy, and filling body being constructed of corrugated cardboard.

Keywords: Pollutant, surface barrier



3,757,527

WAVE DEFLECTING DEVICE FOR A SEA WALL

Daniel Franklin Keller, Wilmette, Ill., assignor to Keller-Dee Research and Development Corp., Northbrook, Ill.

Filed Feb. 14, 1972, Ser. No. 226,053

Int. Cl. E02b 3/20

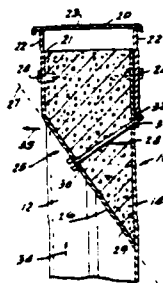
U.S. Cl. 61-49

13 Claims

A wave deflecting device for use on a sea wall which has an undulating surface of vertically extending ridges and trough-like depressions characterized by a plate being disposed in each of the troughs on a plane extending between a horizontal plane and a vertical plane to block and to deflect an upward flow of water in the trough back to the body of water. Preferably the plate is used with a sea wall which is formed of sheet metal pilings which wall has a cap at the upper edge of the wall and has a filling material such as concrete disposed between the cap and the plates. In one embodiment the plate is provided with edge portions diverging from one end which conform to the diverging side walls of the trough and is provided with lateral portions along the edge portion to extend into the lateral portions of the trough. Another embodiment of the invention provides lateral extending portions at the other end to overlie portions of the adjacent ridges to deflect water that is moving upwardly along the ridges back to the body of water.

Keywords: Pile, sheet; Pile, steel; Seawall

U.S. Cl. X.R. 61-4; 61-60



3,757,953

DECANTING SKIMMER

William A. Sky-Eagle, Jr., 1038 Meadowbrook Dr., Corpus Christi, Tex.

Filed May 26, 1972, Ser. No. 257,283

Int. Cl. E02b 15/04

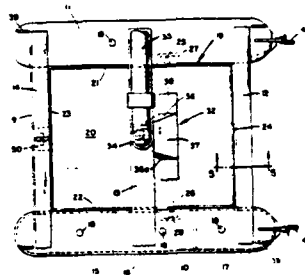
U.S. Cl. 210-242

4 Claims

An apparatus for skimming oil or other scum from the surface of water, has floats supporting a sump tank with a weir at its forward end, means for pivoting the sump around a transverse axis to adjust the depth of the weir below the surface of the water and pumping means for withdrawing liquid collected in the sump

Keywords: Pollutant collection; Pollutant, suction removal

U.S. Cl. X.R. 210-DIG.21



3,758,788

CONVERSION SYSTEM FOR PROVIDING USEFUL ENERGY FROM WATER SURFACE MOTION

Dale T. Richeson, 1404 Kalaniki St., Honolulu, Hawaii

Filed June 14, 1971, Ser. No. 152,931

Int. Cl. F03b 13/12

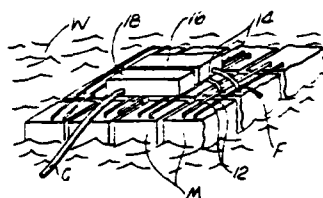
U.S. Cl. 290-42

6 Claims

An energy-conversion system is disclosed for converting water surface movement, e.g. wave motion, to useful energy. Buoyant structures are provided defining pairs of opposed surfaces affixed together by pivotal structures with energy means, e.g. bellows, held spaced-apart from the pivot means. In the disclosed embodiment, the bellows are actuated with displacements between the buoyant structures, to develop positive fluid pressures to accomplish various operations. As disclosed, a turbine is driven to motivate an electrical generator for providing electrical power through a conductor to an electrical load.

Keywords: Power, wave; Pump

U.S. Cl. X.R. 60-57; 290-1; 290-53; 417-332



SEPTEMBER 18, 1973

3,759,043

**MOLDS FOR USE IN MANUFACTURING ENERGY
DISSIPATING CONCRETE BLOCKS FOR RIVER AND
MARINE WORKS**

Kazumi Tokunaga, No. 1410, Sakae-machi, City of Soka,
Saitama Prefecture, Japan

Filed Aug. 25, 1969, Ser. No. 852,580

Claims priority, application Japan, Sept. 19, 1968, 43,67813
Int. Cl. E02b 3/08, 3/14

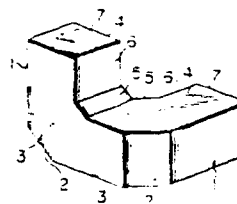
U.S. Cl. 61-4

1 Claim

Molds for use in manufacturing energy dissipating concrete blocks for river and marine works are composed of a set of plates coming into contact with concrete, each having a simple geometrical shape in its plan view, and various type of molds can be obtained by the combination of the plates. The concrete blocks manufactured by the molds can be easily combined to form regular geometrical designs having specific percentages of voids respectively, resulting in their vast application in all sorts of marine and river works.

Keywords: Concrete armor unit; Concrete form

U.S. Cl. X.R. 52-609; 249-10; 249-102;
249-156



3,759,045

MONOMOORING SEA PLATFORM

Vladimir Nastasic, San Donato Milanese, Italy, assignor to Interconsult S.p.A., Milan, Italy

Filed Feb. 4, 1972, Ser. No. 223,566

Claims priority, application Italy, Oct. 26, 1971, 30325 A/71

Int. Cl. B63b 21/00

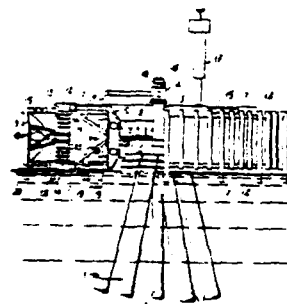
U.S. Cl. 61-46

3 Claims

A sea platform comprising a metal structure anchored to ground and a head projecting from the sea surface and carried by the metal structure by a bearing, to the vertical axis of which the head is freely rotatable. The head comprises two annular bodies interconnected by resilient elements. The metal pipes extending from the inlets connectable to the hoses to the pipes upward extending from the ground are all enclosed within the periphery as defined by the rotatable head. Thus, the risks are substantially reduced of damaging the platform and pipes carried thereby by vessels moored to the platform or passing through adjacent thereto.

Keywords: Collision protection; Offshore mooring structure; Offshore platform, fixed; Offshore structure fender

U.S. Cl. X.R. 61-48; 114-230; 141-357;
267-139



3,759,046

MOVEMENT OF MARINE STRUCTURES IN SALINE ICE Edward O. Anders, Houston, Tex., assignor to Global Marine, Inc., Los Angeles, Calif.

Continuation-in-part of Ser. No. 130,092, April 1, 1971. This application Mar. 23, 1972, Ser. No. 237,398

Int. Cl. E02b 15/02, B63b 35/12

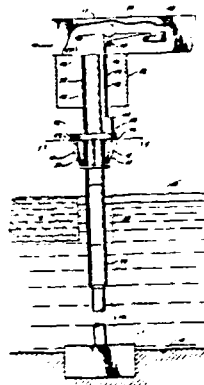
U.S. Cl. 61-46.5

18 Claims

Relative movement between a surface-piercing marine structure and a sheet of saline ice is enabled by applying heat to the ice from the structure at a rate sufficient to cause ice proximately adjacent the structure to be heated essentially to its melting point, at which temperature the strength of the ice is reduced sufficiently to permit the structure to break through the ice, thus enabling the desired relative motion. Also, the rate of heat transfer from the structure may be sufficient, in terms of the rate of relative motion, to melt the ice adjacent the structure at a rate equal to the rate of relative motion.

Keywords: Ice protection; Offshore mooring structure; Offshore platform, leg; Offshore structure fender; Pile protection

U.S. Cl. X.R. 61-63; 114-0.5; 114-41; 165-1



3,759,097

ELECTROMAGNETIC WATER CURRENT METER

Vincent J. Cushing, 9804 Hillridge Dr., Kensington, Md.

Filed Sept. 1, 1970, Ser. No. 68,674

Int. Cl. G01p 5/08

U.S. Cl. 73-194 EM

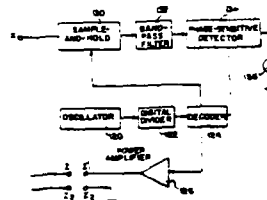
18 Claims

A body means of electrically non-conductive material supports at least one pair of electrically conductive detecting electrodes disposed at opposite portions of the body means. Means is supported within the body means between the electrodes for producing an alternating magnetic field. An electrical circuit is connected to the detecting electrodes and includes indicating means. In one form of the invention, electrically conductive guard means is disposed adjacent the electrodes and means is provided for establishing a potential on the guard means which is directly proportional to the potential on the detecting electrodes. In another form of the invention, means is provided for driving the electromagnet to produce an alternating magnetic field at a predetermined frequency wherein the magnetic field is driven to a finite value for a predetermined time interval during each cycle, and the electrical circuit includes means for measuring the signal from the detecting electrodes during a time delayed portion of said time interval. In a further form of the invention, pairs of oppositely disposed detecting electrodes are provided at right angles to one another so as to indicate the direction of water current flow. In each form of the invention, shield means is preferably employed in the form of electrically conductive material disposed between the detecting electrodes and the means for producing the magnetic field.

Keywords: Current measurement

U.S. Cl. X.R. 73-181

See: Re. 28,989



3,759,390

THE REMOVAL OF SURFACE LAYERS FROM LIQUIDS
Frederick Walter McCombie, London, England, assignor to
Megator Pumps and Compressors Limited, London, En-
gland

Filed Feb. 10, 1971, Ser. No. 114,157

Claims priority, application Great Britain, Mar. 5, 1970,
10,540/70; Aug. 26, 1970, 41,089/70

Int. Cl. E02b 15/04

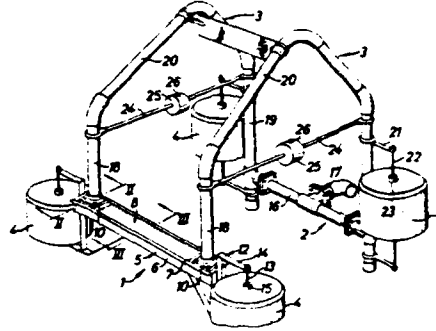
U.S. Cl. 210-242

3 Claims

A device for pumping away floating oil slicks comprises a floating inlet chamber. Oil is drawn through an upper wall of the chamber and is pumped upwardly from the lower part of the chamber. Two embodiments are described one of which includes an outlet part connected to the chamber by parts which can straddle a boom confining the oil and the other of which includes a circular chamber supported by a long dependent pipe.

Keywords: Pollutant, suction removal

U.S. Cl. X.R. 210-DIG.21



SEPTEMBER 25, 1973

3,760,518

ROTARY DREDGE CUTTER-HEAD HAVING SPACED
GUARD MEMBERS

Alton B. Hamm, P.O. Box 13444, Fort Worth, Tex.

Filed Feb. 3, 1972, Ser. No. 223,229

Int. Cl. E02f 3/92, 3/94

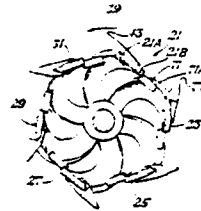
U.S. Cl. 37-57

12 Claims

Cutter-head for use in a dredging system for dredging sand and gravel which has a plurality of spaced guard members extending from the trailing edge of each support member toward an adjacent support member but spaced therefrom. The guard members are located inward of cutting teeth coupled to the leading edge of each support member. The guard members block the passage of large rocks into the interior of the head but to allow the passage of roots and clay along with the sought after sand and gravel thereby preventing the roots and clay from blocking the openings of the cutter-head.

Keywords: Dredge, cutterhead; Dredge intake

U.S. Cl. X.R. 37-67; 37-189



3,760,754

MODULAR UNIT FOR A FLOATING DOCK SYSTEM

Glenn R. Drummond, Raleigh, and Barry F. Clutter, Cary,
both of N.C., assignors to Koppers Company, Inc.

Filed May 24, 1971, Ser. No. 146,139

Int. Cl. B63b 35/00

U.S. Cl. 114—5 F

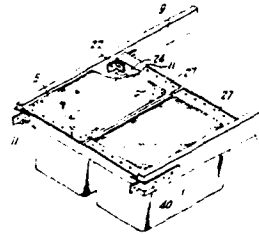
1 Claim

A modular unit for a floating dock system for marinas is presented

The unit includes a deck buoyed by plastic pontoons which include a self-adjusting water ballast feature.

Keywords: Pier, floating; Small-craft pier

U.S. Cl. X.R. 61-48



3,760,761

UNDERWATER KITE DEVICE

Kousuke Umazume, 13-5, 2-chome, Shimorenjaku, Mitaka-shi, Tokyo, Japan

Filed Nov. 30, 1972, Ser. No. 310,926

Claims priority, application Japan, Dec. 2, 1971, 46/97494

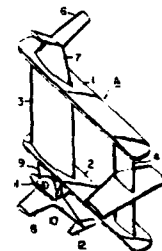
Int. Cl. 63b 21/56

U.S. Cl. 114—235 B

6 Claims

A kite device to be towed in water which is adapted to carry various telemetering instruments for measuring schools of fish, depths of the sea and carrying out other functions, and which comprises a pair of frames disposed in the towing direction, a transverse main wing and tail surfaces extending between and connecting the pair of frames at the forward and aft parts thereof, respectively, a first deviation wing provided at a transversely outer position relative to one frame, and second deviation wing provided at a transversely outer position relative to the other frame, the hydrodynamic force created by the first deviation wing for moving the kite device in a transversely outward direction being greater than the force created by the second deviation wing for moving the kite device in the opposite transverse direction.

Keywords: Towed body depth control; Towed vehicle



OCTOBER 2, 1973

3,762,078

BENTHIC DREDGE CONSTRUCTION

Thomas J. Wetherbee, Saginaw, Mich., assignor to Trippensee Corporation, Saginaw, Mich.

Filed June 5, 1972, Ser. No. 259,425

Int. Cl. E02H 5/00

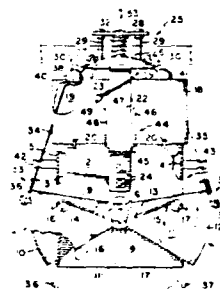
U.S. Cl. 37-54

11 Claims

A dredge especially adapted for taking samples from the bottom of a body of water comprises a hollow body open at its top and bottom, but provided at both its top and its bottom with closures movable between open and closed positions and biased to their closed positions. The top and bottom closures are equipped with means for latching the closures in their open positions. A latch release mechanism is provided for effecting release of the closure latch members so as to enable the closures to move from their open positions to their closed positions.

Keywords: Dredge, mechanical; Sampler, seabed grab

U.S. Cl. X.R. 37-184; 175-253; 214-656



3,762,168

WATER POLLUTION CONTROL

Richard L. Pardee, 8716 Newton Falls Rd., P.O. Box 4, Wayland, Ohio

Filed Sept. 10, 1971, Ser. No. 179,343

Int. Cl. E02b 15/04

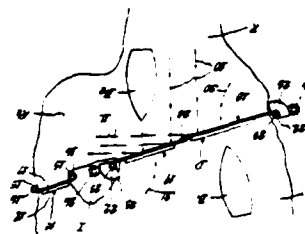
U.S. Cl. 61-1 F

2 Claims

The invention relates to devices for removing pollutants from water, particularly navigable streams, rivers and lakes. In one form, the invention comprises a skimming device which is disposed at an acute angle to the flow of water and is operable to direct the pollutants skimmed from the water to a collecting area such as a reservoir, from where it may be removed from time to time. In another form, the device is operable to protect an off-shore working area, such as an oil well rig, against pollution of the water, by disposition of a skimming device in surrounding relation with respect thereto.

Keywords: Channel barrier; Pollutant collection; Pollutant, surface barrier

U.S. Cl. X.R. 61-24; 61-46



3,762,169

FLOATING WATER JET FOR OIL SLICK CONTROL

Douglas J. Graham, Port Hueneme, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 23, 1972, Ser. No. 283,021

Int. Cl. E02b 15/04; B05b 1/04

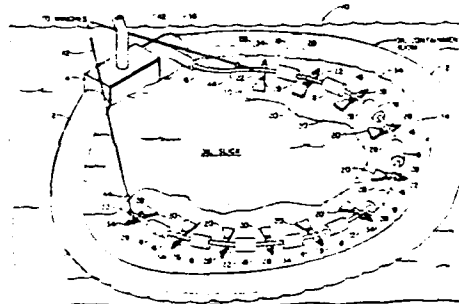
U.S. Cl. 61-1 F

6 Claims

A device to direct floating oil into a recovery mechanism comprising a flexible rubber hose having attached floats positioned at spaced intervals. Water jets are operatively connected to the hose between the floats, and counterweights are added to uniformly balance the unit. A water pump provides water to the hose which is sprayed by the jets against the oil slick, forcing it to the recovery mechanism.

Keywords: Pollutant collection

U.S. Cl. X.R. 210-242; 210-DIG.21; 239-550; 239-587; 239-598



3,762,557

FLOATING SKIMMER

Adney J. Tudor, and Edward E. Tudor, both of London, Ontario, Canada, assignors to Watermaster Industries Limited, London, Ontario, Canada

Filed Aug. 23, 1971, Ser. No. 173,994

Int. Cl. E02b 15/04

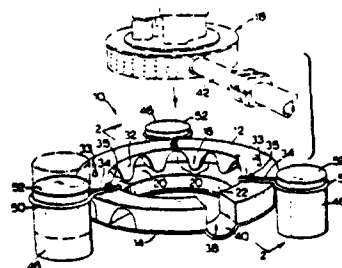
U.S. Cl. 210-242

4 Claims

A floating surface skimmer particularly adapted for use with a floating pump housed by said skimmer. The skimmer is circular in shape and has a plurality of peripheral radial openings communicating with a central opening in which the pump is housed whereby each of the said peripheral openings acts as a weir. The height of the skimmer above a liquid surface can be adjusted to control the depth of liquid skimmed.

Keywords: Pollutant, suction removal; Pump

U.S. Cl. X.R. 210-DIG.21



3,762,558

ANTI-POLLUTION BARGE AND CONVEYER ASSEMBLY
Joseph Axel Anderson, 5155 Langelier Boulevard, Montreal,
Quebec, Canada

Filed Sept. 30, 1971, Ser. No. 185,175

Int. Cl. E02b 15/04; B01d 43/00

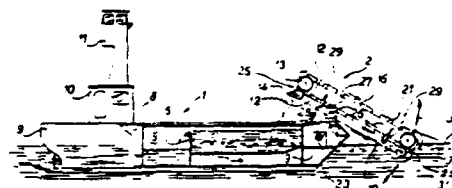
U.S. Cl. 210-242

3 Claims

A conveyer arrangement adapted to be used onto a barge or similar boat in combination therewith and including two superjacent endless-belt conveyers arranged to cooperatively pick up a floating pollutant, such as oil, and to convey the same upwardly between adjacent runs of the respective conveyers which are driven at substantially the same linear speed. Transverse ribs are secured to the top endless-belt conveyer and extend therefrom into liquid-tight edgewise engagement with the top run of the bottom endless belt in cooperation with longitudinally extending flexible wings arranged to laterally confine the picked-up pollutant and water during upward displacement thereof intermediate the two adjacent runs. The conveyers are pivoted onto the bow and the barge is provided with water ballast tanks to adjust the dipping depth of the outer end of the conveyers.

Keywords: Pollutant debris; Pollutant, mechanical removal; Pollutant removal watercraft

U.S. Cl. X.R. 37-69; 210-DIG.21; 210-400; 210-526



OCTOBER 9, 1973

3,763,580

APPARATUS FOR DREDGING IN DEEP OCEAN
Francis A. Kuntz, Jr., San Pedro, Calif., assignor to Global
Marine Inc., Los Angeles, Calif.

Filed Dec. 10, 1970, Ser. No. 96,858

Int. Cl. E02f 3/88

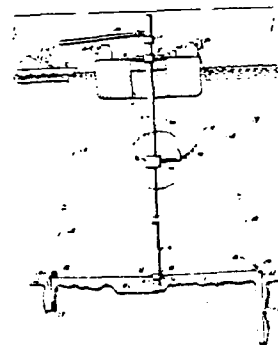
U.S. Cl. 37-61

8 Claims

A surface stratum of an ocean bottom is dredged by a dredging tool connected to the lower end of an elongated hollow conduit pendulously supported from a floating vessel. A plurality of tool guiding lines extend from the vessel to the conduit via respective guides anchored at locations spaced about the region to be dredged. The effective lengths of the guide lines are adjusted from respective winches mounted on the vessel to sweep the dredging tool back and forth across the region to be dredged. The conduit is rotated about its vertical axis to operate the dredging tool, and an air lift sub injects a stream of air under pressure into the conduit above the dredging tool to lift the cuttings removed from the ocean bottom up through the hollow interior of the conduit.

Keywords: Dredge, cutterhead; Dredge ladder control; Pump

U.S. Cl. X.R. 37-65; 175-5



358

3,763,653

**CUSHIONED DOCK FENDER STRUCTURE AND SHEAR
TYPE CUSHION MEMBER**

John Anoush Shirvany, Simi, Calif., assignor to Byron Jackson
Inc., Long Beach, Calif.

Filed Sept. 8, 1971, Ser. No. 178,589

Int. Cl. E02b 3/22

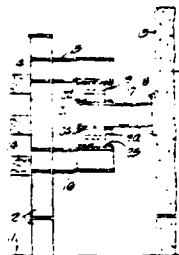
U.S. Cl. 61-46

2 Claims

A dock fender structure for cushioning the impact of vessels thereagainst by the deflection in shear of elastomeric cushion members, and a cushion member adapted for use therein.

Keywords: Pier fender

U.S. Cl. X.R. 61-48



3,763,654

PILE DRIVING AND DRAWING APPARATUS

Kunijiro Matsushita, 53, Kokicho-2-chome, Toyokawa, Japan

Filed Sept. 13, 1972, Ser. No. 288,630

Claims priority, application Japan, Nov. 8, 1971, 46/89287

Int. Cl. E02d 7/20, 7/24; B65h 5/06

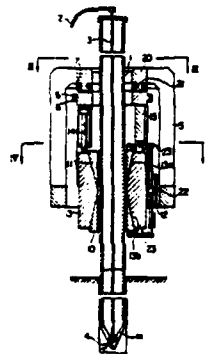
U.S. Cl. 61-53.5

1 Claim

A pile driving and drawing apparatus in which a plurality of drawing and driving wedges are disposed in a substantially hollow cylindrical member having an upwardly tapered and a downwardly tapered inner peripheral surface portion so as to be intimately engageable with these inner peripheral surface portions while releasably holding a pile during drawing operation and driving operation respectively. Means are further provided for causing rotation of the pile being driven and drawn into and out of the earth.

Keywords: Pile driver, water jet; Pile extractor

U.S. Cl. X.R. 61-63; 175-19; 175-21; 214-338; 226-164; 254-105



3,763,656

PLACING OFFSHORE SUPPORTING ELEMENTS

Francois Van Daalen; Johannes Van Steveninck, and Gerardus A. M. Verroen, all of Rijswijk, Netherlands, assignors to Shell Oil Company, New York, N.Y.

Filed Aug. 16, 1971, Ser. No. 172,180

Int. Cl. E02d 7/24

U.S. Cl. 61—53.74

4 Claims

To place a supporting element in the soil, it is lowered into the soil after fluidizing the soil by water injection. Thereafter, consolidation of the soil is speeded up by supplying water thereto at a relatively low velocity.

Keywords: Embedment anchor; Offshore construction; Pile driver, water jet; Pile footing; Seabed foundation; Seabed soil treatment

U.S. Cl. X.R. 61-36; 61-50



3,763,808

UNIVERSAL MARINE MODULE

Richard H. Smith, Sr., 2926 Sing Sing Rd., R.D. 1, Elmira, N.Y.

Filed Feb. 10, 1972, Ser. No. 225,079

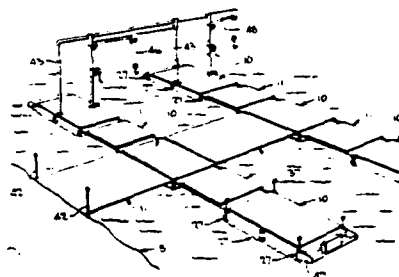
Int. Cl. B63b 35/00

U.S. Cl. 114—0.5 F

9 Claims

A marine module capable of being interconnected with other like modules by means of a coupling platform or platforms into any number of different arrangements for a wide variety of uses, each module comprising a floatable, hollow, metal construction having uniformly spaced coupling brackets thereon, and each platform having connectors thereon, the modules and platforms being rigidly interconnected through the coupling brackets and connectors. Superstructure supports can also be used to couple platforms together.

Keywords: Pier, floating; Small-craft pier



3,763,816

AUTOMATIC DOCKING SYSTEM

Clyde H. Wilson, Jr., P.O. Box 1635, Sarasota, Fla.

Filed Oct. 10, 1972, Ser. No. 296,212

Int. Cl. B63b 21/00

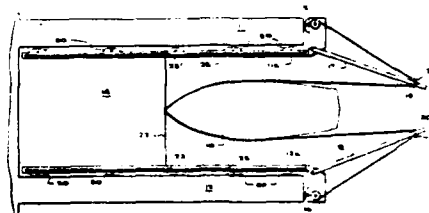
U.S. Cl. 114-230

25 Claims

An automatic boat docking system for guiding and docking a boat in a boat slip; including a pair of laterally spaced dock structures defining a boat slip therebetween and having a pair of pivoted retaining booms at the outer ends of the dock structures adjacent the entrance to the slip movable between a closed position transversely spanning the slip entrance and an open position. A cross-rope movable along the slip and a harness rope are engaged by an entering boat to swing the booms to the closed position behind the boat and wrap the boat in transversely centered position by the harness rope.

Keywords: Small-craft mooring device

U.S. Cl. X.R. 49-115; 49-263; 114-.5BD



3,764,015

APPARATUS FOR CONFINING FLOATING POLLUTANTS

Emmet H. Rolston, R.R. 3, Estherville, Iowa

Filed May 3, 1972, Ser. No. 250,062

Int. Cl. E02b 15/04

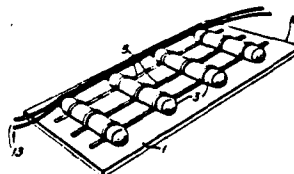
U.S. Cl. 210-242

3 Claims

A sizeable number of substantially rectangular buoyant lightweight and fireproof platforms are provided which are connected in series and adapted to be towed to the site while flat, made to surround the area from which the pollutants are to be removed, and then rotated approximately 180° on their axes to assume a substantially vertical position. While in vertical position these substantially rectangular platforms are adjustable as to the depth to which they extend. After the pollutants have been removed to a satisfactory extent, the substantially rectangular platforms are rotated on their longitudinal axes to assume their initial flat position, and then towed away while still serially connected as before. Means for effecting the aforementioned rotational movement of each of the substantially rectangular platforms is provided by one or more elongated tanks which extend transversely of the platforms, and which are divided by an airtight partition into an airtight flotation compartment and an airtight ballast compartment, together with means for adjusting the quantity of water in each of the ballast tanks; also for adjusting the depth to which the platforms extend into the water when in their vertical positions.

Keywords: Pollutant, suction removal;
Pollutant, surface barrier

U.S. Cl. X.R. 61-1F; 210-DIG.21



OCTOBER 16, 1973

3,765,184

**DEVICE AND METHOD FOR THE ATTACHMENT OF
PIPELINES TO AN UNDERWATER SURFACE**

Louis Francois A. Menard, Paris, France, assignor to Compagnie Francaise Des Petroles and Techniques Louis Menard, both of Paris, France

Filed Sept. 27, 1971, Ser. No. 183,919

Claims priority, application France, Mar. 8, 1971, 7107866

Int. Cl. F16L 1/00; B63b 21/26

U.S. Cl. 61-72.3

21 Claims

An apparatus and a method of securing an underwater pipeline to the bed of a body of water is provided. A buoyant boom is attached to a floating line to be guided down to the pipeline. The floating line is secured to the pipeline by a clip that can utilize compressed air to penetrate the underwater bed. The buoyancy of the boom can be controlled to regulate both ascent and descent. A sled like base member is attached to the boom by a cardan joint and carries both a source of compressed air and a control panel. A television system can be utilized to monitor the control panel and the actual sinking of inverted L-shaped piles by a vibro-piledriver

Keywords: Embedment anchor; Seabed pipeline placement

U.S. Cl. X.R. 61-53; 61-53.5; 114-206; 294-66



3,765,236

**APPARATUS FOR RECORDING SWELL FREQUENCY
AND PROPAGATION DIRECTION OF WAVES**

Ladislav Erdelyi, Paris, France, assignor to Agence Nationale de Valorisation de la Recherche, Paris, France

Filed Feb. 24, 1971, Ser. No. 118,285

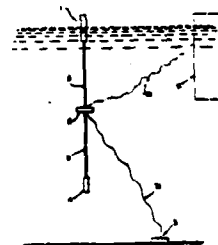
Int. Cl. G01d 21/02; G01w 1/00

U.S. Cl. 73-170 A

5 Claims

Apparatus for measuring the swell frequency and propagation direction of an ocean wave which comprises a swell collector including a water gauge which is partially submerged, the collector being connected by a rigid shaft to a ballast. A flexible connection is provided to an anchoring device and the collector encloses a magnetic compass and a counter. Remote readout means are also included.

Keywords: Buoy, instrumented; Wave measurement



3,765,923

**PROCESS AND COMPOSITION FOR BLAST-CLEANING
AND CORROSION-PROTECTING METAL SURFACES**

Bent Bender-Christensen, Gentofte, Denmark, assignor to
J. C. Hempel's Skibsfarve-Fabrik A/S, Lyngby, Denmark
Filed Dec. 13, 1971, Ser. No. 207,556

Claims priority, application Great Britain, Dec. 14, 1970,
59,328/70

Int. Cl. B44d 1/02

U.S. Cl. 117-26

20 Claims

A process and composition for blast-cleaning metal surfaces, particularly steel surfaces, and simultaneously depositing a corrosion protective metal thereon. Abrasive particles carrying a protective metal, especially zinc, at their outer surface are used as the blast abrasive. The protective metal is bound to the abrasive particles by means of a binder.

Keywords: Coating; Corrosion prevention

U.S. Cl. X.R. 51-308; 51-309; 106-1;
106-14; 117-29; 117-71M; 117-100S; 117-105;
117-123B; 117-130R; 117-160R; 117-169A

No Figure

3,765,933

**METHOD FOR THE PROTECTION AGAINST AQUATIC
PARASITES**

Jean Leheureau, 54, grande rue de St. Rambert, Lyon, and
Louis Bourdon, 40, chemin des Balmes, St. Foy les Lyon,
both of France

Continuation of Ser. No. 16,972, March 5, 1970, abandoned.
This application June 28, 1972, Ser. No. 267,124

Int. Cl. C09d 5/14

U.S. Cl. 117-132 R

2 Claims

Method for protecting submarine works against aquatic parasites comprising applying to same a composition containing cuprous alkyl or alkylene thiocarbamates.

Keywords: Coating; Fouling prevention

U.S. Cl. X.R. 106-15AF; 106-16; 106-236;
106-241; 117-148; 117-150; 260-41

No Figure

3,766,032

METHOD FOR CONTROL OF MARINE FOULING

Andrew S. Yeiser, 302 Cleveland Dr., Huntington Beach, Calif.
Filed July 19, 1971, Ser. No. 163,883

Int. Cl. C23f 13/00

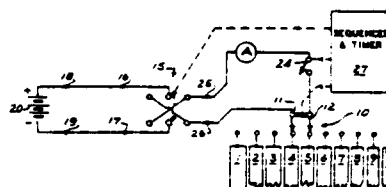
U.S. Cl. 204-147

8 Claims

An electrical apparatus and method for eliminating the fouling of boat bottoms and the like by marine growth. The underwater surface is sheathed with strips of a metal such as stainless steel. An electric current is passed between adjacent strips or areas, preferably for short periods of time on a regular "maintenance" schedule, e.g., 30 amperes per square foot for a few seconds every two days. The sheathing may be of 0.020" stainless steel in 3-inch wide strips spaced 0.1" apart. Test panels in sea water are found to remain clean and bright after six months immersion when so energized, while identical panels to which no current is applied become heavily fouled. Ions produced by electrolysis close to the sheathed surface move at relatively high velocities, and are found to kill the small organisms that settle on the surface. No persistent toxic chemicals such as mercury compounds are released into the water, and only minute quantities of dead organic matter are released at any one time.

Keywords: Cathodic protection; Fouling prevention

U.S. Cl. X.R. 204-196



3,766,307

BUOYANT ELECTRICAL CABLES

Daniel E. Andrews, Jr., San Diego, Calif.

Filed Aug. 25, 1972, Ser. No. 284,009

Int. Cl. H01b 7/12

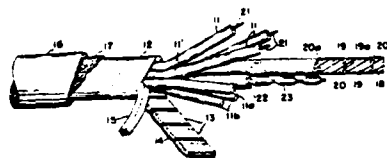
U.S. Cl. 174-47

19 Claims

A cable for marine applications includes a series of discrete noncollapsible or rigid buoyant members carried inside a sheath which serves to hydrodynamically streamline the cable as well as providing electrical insulation. The cable in addition to containing electrical conductors does contain other elements such as fiber optics, hydraulic liners and wire or glass ropes. Furthermore, the buoyancy elements are sized to ensure neutral buoyancy and are formed to be relatively noncollapsible to provide the neutrally buoyant capability irrespective of changing ambient pressures.

Keywords: Instrument cable

U.S. Cl. X.R. 174-36; 174-70R; 174-101.5; 174-115; 174-116



OCTOBER 23, 1973

3,766,583

OFFSHORE LIQUEFIED GAS TERMINAL

Rex V. Phelps, Tulsa, Okla., assignor to Gulf Oil Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 51,812, July 2, 1970, abandoned. This application June 21, 1972, Ser. No. 264,830
Int. Cl. B63b 35/44

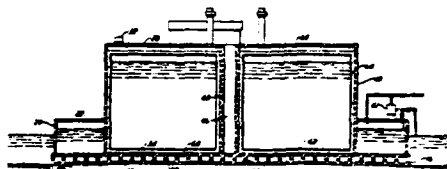
U.S. Cl. 9-8 P

14 Claims

A portable terminal for liquefied natural gas in which a cryogenic storage tank for liquefied natural gas is mounted on a compartmented concrete base having sufficient buoyancy to float the tank and a gas treating plant is constructed on a deck forming the roof of the storage tank. The gas treating plant may be a plant for liquefying natural gas or a plant for gasification of stored natural gas. A barrier wall extending upwardly from the base near its outer edge is spaced from and surrounds the storage tank to form ballast compartments into which water can be pumped to sink the base of the terminal onto the ocean floor. Means are provided to circulate water through the base to prevent freezing of water below the storage tank.

Keywords: Offshore storage tank, emergent; Seabed foundation

U.S. Cl. X.R. 114-0.5T



3,766,671

**METHOD AND APPARATUS FOR EXCAVATING WITH
AN ENDLESS BUCKET LINE**

Ronald M. Guntert, 2402 Clarendon St., Stockton, Calif.

Filed Dec. 20, 1971, Ser. No. 209,584

Int. Cl. E02f 3/14

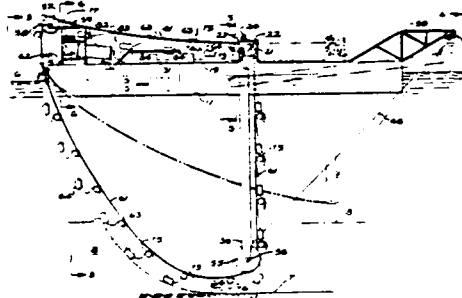
U.S. Cl. 37-69

22 Claims

For underwater excavating I employ a hull having a well. The hull supports a pair of catenary terminals relatively movable toward and away from each other. The terminals may be in the form of rotary drums. Both drums are mounted on the hull for yielding movement such as pivoting about a fore and aft horizontal axis. A continuous flexible line is supported from the hull by being trained around the drums and extends in a catenary curve below the hull to a variable depth controlled by varying the length of the line along the catenary. The line is advanced in a predetermined direction by a driver operating one or more of the drums. Supplemental suspension lines fasten excavating buckets to the continuous line for limited movement. The buckets discharge into material handling equipment on the hull. Preferably, the line shape or catenary curve below the hull is variable by another catenary terminal in the form of another rotary drum, idle or driven, suspended from the hull and movable fore and aft thereon, usually in company with one of the hull mounted drums. The other or additional rotary drum also can swing laterally and fore and aft and can be raised and lowered; i.e., projected and

Keywords: Dredge ladder control; Dredge, mechanical

U.S. Cl. X.R. 37-195; 198-116



3,766,738
APPARATUS

George J. Gauch, South Bend, Ind., assignor to Uniroyal, Inc.,
New York, N.Y.

Filed Apr. 12, 1972, Ser. No. 243,375

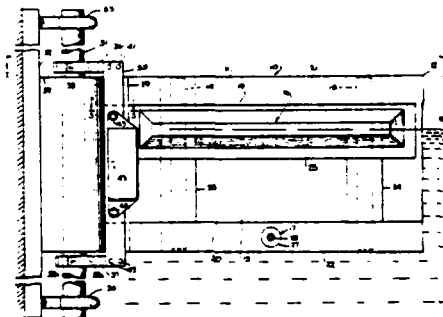
Int. Cl. E02b 15/04

U.S. Cl. 61-1 F

5 Claims

Apparatus for supporting a floating boom which forms a barrier on the surface of a liquid and for forming a seal between the end of the boom and a fixed structure, for example a dock. The apparatus allows lateral and vertical displacement of the boom with changes of wind, current, or tide while maintaining the seal. A deformable, resilient wall held in pressure contact with the dock while supported on a vertically and laterally movable frame displaceable along a vertical pipe spaced from the dock maintains the seal to prevent oil or other pollutants on the surface of the liquid from passing between the end of the boom and the dock.

Keywords: Pollutant, surface barrier



3,766,739

OIL SPILLAGE ENCLOSURE SYSTEM FOR MARINE USE

Glenn J. MacLean, 8901 N. E. 10 Court, Miami, Fla.

Filed May 30, 1972, Ser. No. 257,790

Int. Cl. E02b 3/22, 15/04

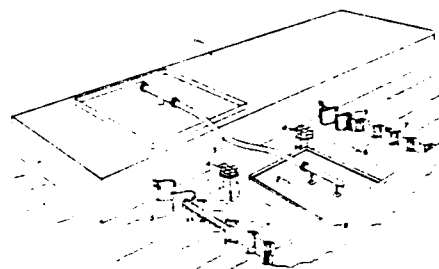
U.S. Cl. 61-1 F

4 Claims

A system for containing oil that might be spilled in handling at a marine oil transfer facility where the floating vessel and the mooring are sides of the containment, two closure devices are provided, one on each side of the hose handling area, between the vessel and the mooring to enclose an area of the water's surface to locally contain a depth of floating oil, wherein the closure sides are movable to compensate for motion of the floating vessel while it's moored.

Keywords: Pier fender; Pollutant, surface barrier

U.S. Cl. X.R. 61-46; 61-48



3,766,879

APPARATUS FOR COATING UNDER WATER

David Fitzherbert Jones, Plummer Water, Narley Woods, Lymington, England

Division of Ser. No. 821,776, May 5, 1969, abandoned. This application Apr. 26, 1972, Ser. No. 247,704

Int. Cl. B63b 59/00

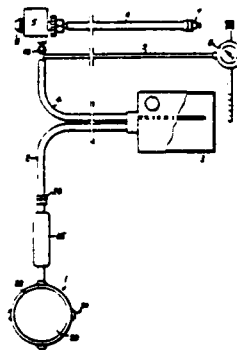
U.S. Cl. 114-222

9 Claims

A method of applying a protective coating to a surface under water which comprises forcing a protective coating composition through an applicator pad, for example using compressed air, at a pressure at least equal to the ambient pressure of the water at the depth at which the coating is applied, and applying the coating composition to the surface by a smearing action of the pad. Apparatus for carrying out the method includes a porous applicator pad, a reservoir for a protective coating composition to be supplied to the applicator pad, a sensing device for sensing the ambient water pressure, and a control device operative to maintain the pressure at which the composition is supplied to the applicator pad at least equal to the sensed pressure. The applicator pad may be a layer of foamed plastics material having an open interconnected cellular structure.

Keywords: Coating; Corrosion prevention; Fouling prevention; Structure repair

U.S. Cl. X.R. 15-1.7; 118-7; 118-266; 401-204



OCTOBER 30, 1973

3,768,265
COFFERDAM

Carl V. Brouillette, Oxnard, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 27, 1971, Ser. No. 184,092

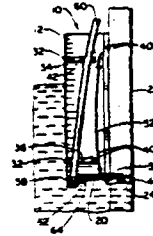
Int. Cl. E02b 1/00

U.S. Cl. 61-34

5 Claims

An improved cofferdam having an inflatable rubberized seal for use along the contact edge thereof. Such seal enables the cofferdam to uniformly fit in a watertight relationship wherever positioned across the face of a piling or other submerged structure.

Keywords: Cofferdam; Pile, sheet; Pile steel; Structure repair



3,768,266
SHORELINE CONSTRUCTION FOR ARTIFICIAL WATER BODIES

J. Marian Glenn, Villa Park, Calif., assignor to Stabilization Chemicals, Anaheim, Calif.

Filed May 1, 1972, Ser. No. 249,192

Int. Cl. E02b 3/04

U.S. Cl. 61-37

12 Claims

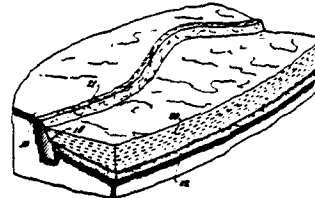
This invention relates to a method of constructing shorelines for artificial water bodies at a reasonable cost and which will, at the same time, be highly wave resistant and provide adequate seepage and erosion control of the shoreline.

The method comprises the excavation of a trench in the outline of the periphery of the desired shoreline. The trench may have a depth of about 4 feet and a width of about eight inches. An elongated pre-molded plastic section is then secured to the upper portion of the trench sidewall closest to the body of water to be enclosed. The opposite side of the pre-molded plastic section is provided with surface irregularities and is thinner than the trench width so as to form an opening between the plastic section and the trench wall. Concrete is then poured through the opening and fills the trench and fully occupies the opening in the trench adjacent the exposed irregular surface of the pre-molded plastic section.

The soil adjacent the premolded section is removed after the concrete has initially set and the plastic sections are then also removed to reveal the irregular surface formed in the concrete. The irregular surface, in its preferred embodiment has a natural rock-like formation and forms the shoreline for the water body to be retained. The plastic sections are preferably made of polyurethane foam core material with a concrete release agent coated thereover.

Keywords: Seawall

U.S. Cl. X.R. 61-39; 61-49



3,768,268
**DRILLING OR PRODUCTION PLATFORM FOR WORK
 AT SEA**

Maurice Laffont, La Celle-Saint-Cloud, and Jean-Jacques Houot, Maisons-Laffitte, both of France, assignors to Entreprise De Recherches Et D'Activites Petrolieres (Elf), Paris, France

Filed Sept. 20, 1971, Ser. No. 181,848

Claims priority, application France, Sept. 21, 1970, 7034115

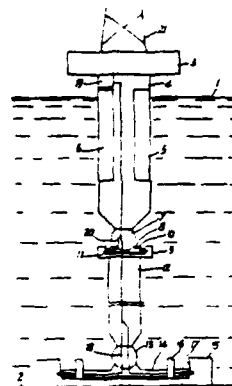
Int. Cl. E02b 17/00; E02d 27/04

U.S. Cl. 61—46.5

9 Claims

A platform for drilling or production operations at sea, consisting of a working platform 3 above sea-level, carried by a column 4 which is buoyant, containing tanks 5 and 6 for ballasting, and equipped with a jointed coupling 7 capable of swinging movement in two relatively transverse planes, connecting this first column to the upper end 9 of a second column 12, the other end of which, possibly equipped with another jointed coupling 13 with two degrees of play, is attached to a base 15 with high non-buoyancy, designed to rest on the sea-bed.

Keywords: Offshore platform anchor; Offshore platform, floating



3,768,571
CABLE OPERATED DREDGING SCOOP

Walter D. Renfro, Geneva, N.Y., assignor to Terra Marine Scoop Company, Inc., Geneva, N.Y.

Filed Sept. 27, 1971, Ser. No. 183,854

Int. Cl. E02f 3/60

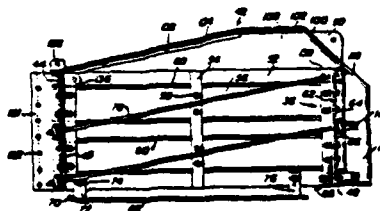
U.S. Cl. 172—26.5

9 Claims

A scoop for removing mud, silt, or the like, from the bottom of bodies of water, such as ponds, lakes, streams, ditches, and the like, embodying an open bottomed scoop having supports along the bottom and along the rear thereof so that the scoop will collect material when pulled along the bottom surface in a forward direction with the scoop generally being horizontally disposed. The scoop can move in a reverse direction without collecting material with the scoop generally being vertically disposed.

Keywords: Dredge, mechanical

U.S. Cl. X.R. 37-71; 37-135



3,768,656
OIL ACCUMULATOR
 John B. Nugent, Winthrop, Mass., assignor to Massachusetts
 Institute of Technology, Cambridge, Mass.
 Filed May 28, 1971, Ser. No. 148,107
 Int. Cl. E02b 1/504

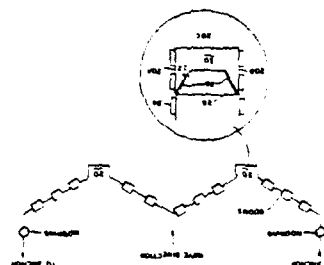
U.S. Cl. 210-242

4 Claims

A floatable unit for accumulating oil from the surface of water, essentially comprising a framed member having three sides and open at the top and bottom thereof, and also having an open end called the bow, said member including an appropriately located ramp and baffles. The accumulator is inserted into a line of booms at appropriate intervals. A wave with oil on its surface enters the accumulator, surges up over the ramp, and the oil is trapped in the unit for later removal.

Keywords: Pollutant collection; Pollutant, surface barrier

U.S. Cl. X.R. 61-1F; 210-DIG, 21



NOVEMBER 6, 1973

3,769,802
WALKING LIFT BARGE
 Kurt Wefer, Cologne, Deilbrück, Germany, assignor to
 Strabag Bau-AG, Cologne-Dents, Germany
 Filed Jan. 29, 1970, Ser. No. 6,460
 Claims priority, application Germany, Jan. 31, 1969, P 19
 04 726.8

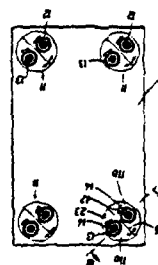
Int. Cl. E02b 17/00; E02f 9/04; B65b 21/50
 U.S. Cl. 61-46.5

10 Claims

A walking lift barge includes a platform having a rotatable member rotatably mounted thereon. A pair of spaced-apart substantially vertical legs extend through the rotatable member. The legs are selectively movable up and down relative to the rotatable member. With the platform supported on one leg, the rotatable member can be rotated around that one leg to move the other leg and the platform laterally.

Keywords: Offshore platform, jack up; Offshore platform, walking

U.S. Cl. X.R. 37-73; 115-9



3,769,803

SUBMERGED STORAGE VESSEL

Herschel D. Finney, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Feb. 23, 1972, Ser. No. 228,625

Int. Cl. E02b 17/00; E02d 7/24

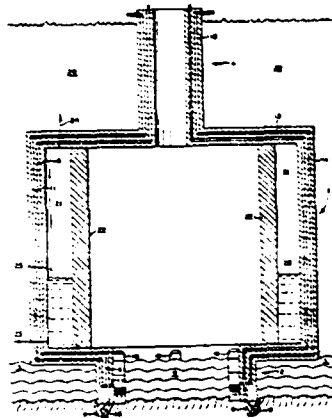
U.S. Cl. 61-46.5

10 Claims

A submergence storage vessel comprised of at least a lower section and an upper section, the lower section being adapted for positioning into the underwater formation to an extent such that a substantially horizontally disposed wall comprising the upper section, is positioned in contact with the formation.

Keywords: Offshore storage tank, emergent; Seabed foundation

U.S. Cl. X.R. 61-53,74



3,769,838

WAVE MEASURING APPARATUS

Lawrence A. Buckler, Nova Scotia, Canada, assignor to Her Majesty the Queen in right of Canada, as represented by the Minister of National Defence

Filed Nov. 18, 1971, Ser. No. 199,951

Claims priority, application Canada, Jan. 29, 1971, 104,004

Int. Cl. G01p 5/00

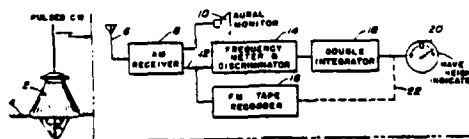
U.S. Cl. 73-170 A

10 Claims

Wave measuring apparatus for determining the wave height on the surface of the sea, including a buoy having an antenna whereby when floating on the sea its motion causes electronic circuitry within it to transmit bursts of RF signals, the pulse repetition rate varying directly in proportion to the acceleration applied to the buoy as it moves up and down on the surface of the sea in which it is located. Ship-borne apparatus is provided to receive the signals transmitted by the wave buoy to analyze them and to provide an indication of the height of the waves of the sea in which the buoy is located.

Keywords: Buoy, instrumented; Wave measurement

U.S. Cl. X.R. 73-517R



3,769,842

SUBMERSIBLE SAMPLER

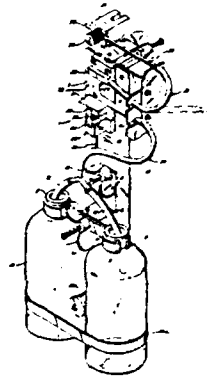
Joseph Kahl, 8049 Prospect Way, La Mesa, Calif.
Filed Jan. 5, 1972, Ser. No. 215,516
Int. Cl. G01n 1/12

Keywords: Sampler, water

U.S. Cl. 73—425.6

7 Claims

One or more receptacles are mounted on a frame so that they can be released therefrom. The receptacles are evacuated before use and are connected with a thin readily flexible hose which has sealingly received in its free end a glass tube, an exposed end portion of which is sealed so that the vacuum in the receptacles is not broken. The tube is so looped and the glass tube so held, that when the device is actuated the glass tube will be broken so as to permit aspiration of a water sample into the receptacle. A time delay device closes the flexible tube after a predetermined period of time so that the sample will not be contaminated when the sampler is raised out of the medium in which it has been submerged.



3,770,080

**DEVICE FOR GENERATING ACOUSTIC WAVES BY
IMPLOSION**

Jean Laurent, Saint Germain-en-Laye, and Pierre Magneville,
Vernouillet, both of France, assignors to Institut Francais
Du Petrole Des Carburants Et Lubrifiants, Rueil-Malmaison
(Hauts-de-Seine), France

Filed Sept. 20, 1971, Ser. No. 182,040

Claims priority, application France, Sept. 24, 1970,
7034726

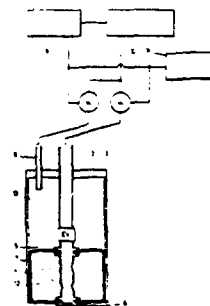
Keywords: Seismic implosive acoustic
transmitter

Int. Cl. G01v 1/02

U.S. Cl. 181—5 H

12 Claims

Device for generating pressure waves in a liquid medium comprising a hollow cylinder closed at one end by a bottom and at the other hand by an inflatable membrane pressing against the inner cylinder wall in the position of closure of the cylinder and capable to collapse abruptly when deflated, thereby giving passage to the liquid medium. For operating the device a substantial vacuum is created in the cylinder when closed by the membrane in inflated position and, by controlling the gas pressure in the enclosure formed by the membrane, the latter is allowed to collapse abruptly, so that the subsequent abrupt rush of liquid in the cylinder generates sound waves.



3,770,626

SORBENT BELT

Ray R. Ayers, Houston, Tex., assignor to Shell Oil Company, New York, N.Y.

Filed Oct. 26, 1971, Ser. No. 192,429

Int. Cl. B01d 33/14; E02b 15/04

U.S. Cl. 210—40

9 Claims

Apparatus and method for removing a polluting liquid from a water surface, the apparatus being composed of a sorbent body shaped to form free flow paths which move the pollutant into increased contact with the sorbent body; the method involving a sorbent body shaped to form free flow paths and moving the sorbent body through the water to cause the pollutant to flow in the free flow paths to increase contact with the sorbent body.

Keywords: Pollutant absorption; Pollutant, mechanical removal

U.S. Cl. X.R. 210-242; 210-400; 210-DIG.21



3,770,627

CONTAINING AND REMOVING OIL SPILLS ON WATER

Henry E. Alquist and Robert T. Werkman, Bartlesville, Okla., assignors to Phillips Petroleum Company

No Drawing. Filed Dec. 7, 1971, Ser. No. 205,740

Int. Cl. E02b 15/04

U.S. Cl. 210—40

8 Claims

A method is provided for containing oil on a water surface and removing the oil from the water surface by fusing a finely particulate polyolefin floating on the surface with the oil to incorporate the oil into a crust-like fused mass which will act to form a boundary against extension of the oil mass and which can be easily skimmed from the water surface.

Keywords: Pollutant burning; Pollutant coalescence; Pollutant, surface barrier

U.S. Cl. X.R. 61-1F

No Figure

NOVEMBER 13, 1973

3,771,653

COMPOST FOR REMOVING OIL FILMS FROM WATER

John P. Harn, Chicago, Ill., assignor to International Minerals & Chemical Corporation, Libertyville, Ill.

Filed Nov. 17, 1970, Ser. No. 90,459

Int. Cl. C02b 9/02

U.S. Cl. 210—40

8 Claims

An oil film is removed from the surface of water by contacting the same with compost prepared by the bacterial digestion of organic waste material.

Keywords: Pollutant absorption

U.S. Cl. X.R. 210-DIG.21

No Figure

3,771,662

OIL RECOVERY SYSTEM

Tateo Muramatsu; Kuninori Aramaki, both of Yokohama, and
Yoshikazu Kondo, Tokyo, all of Japan, assignor to Bridge-
stone Tire Company Limited, Tokyo, Japan

Filed Apr. 18, 1972, Ser. No. 245,245

Claims priority, application Japan, Apr. 30, 1971, 46/27911

Int. Cl. E02b 15/04

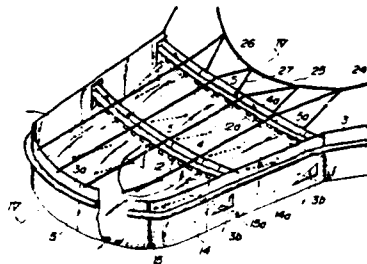
U.S. Cl. 210—242

5 Claims

A system for recovering oil spilled on water surface, by sweeping oil films on the water surface into a mobile U-shaped oil fence line. An oil-collecting zone is formed in the U-shaped oil fence line, where all the oil films swept thereby are collected to form a comparatively thick oil film, so that the oil is efficiently removed from that zone.

Keywords: Pollutant collection; Pollutant, surface barrier

U.S. Cl. X.R. 210-DIG.21



NOVEMBER 20, 1973

3,772,805

**METHOD AND SUCTION DREDGING INSTALLATION
FOR CONVEYING DREDGING SPOIL**

Jan De Koning, Soetendaal, Netherlands, assignor to N.V.
Ingenieurs-bureau voor Systemen en Octrooien "Span-
staal," Rotterdam, Netherlands

Filed Mar. 3, 1969, Ser. No. 803,915

Claims priority, application Netherlands, Mar. 6, 1968,
6803191

Int. Cl. E02f 3/90

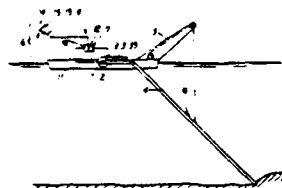
U.S. Cl. 37—58

12 Claims

The pressure difference across the pump of a suction dredging installation and/or the rate of change of this pressure difference are determined. The suction pipe is connected to the pump for withdrawing a suspension of the dredged material and the dredging operation is controlled in accord with the pressure difference related values determined to maintain the pump working at optimum conditions.

Keywords: Dredge, suction; Dredge ladder control; Dredge-spoil measurement

U.S. Cl. X.R. 37-195; 37-DIG.19; 137-4;
137-7; 137-92; 333-19; 417-19; 417-63;
417-300



3,773,008

FENDER DEVICE FOR SHIPS AND OTHER BOATS

Paul Francois Guienne, Paris, and Jacques Francois Robert Prouhet, Les Clayes-sous-Bois, both of France, assignors to Bertin & Cie, Plaisir, France

Filed Jan. 26, 1972, Ser. No. 220,799

Claims priority, application France, Jan. 27, 1971, 7102689

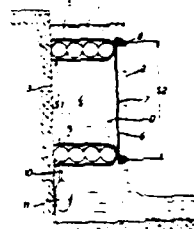
Int. Cl. B63b

U.S. Cl. 114-219

11 Claims

A fender device is interposed between the hull of a ship and a wharf or the hull of another ship to absorb the shocks and generate a horizontal repulsion force to move them apart when they tend to approach each other. This fender device is submerged and comprises a deformable water-filled chamber surrounded by a waterproof flexible wall ending with a peripheral lip which defines, with the approaching structure, a daylight clearance for the leakage of water from the chamber upon crushing of the latter due to the approach movement.

Keywords: Pier fender



3,773,059

JET CLEANING APPARATUS FOR BOATS

Howard M. Arneson, San Rafael, Calif., assignor to Arneson Products Inc., San Rafael, Calif.

Filed Sept. 3, 1971, Ser. No. 177,673

Int. Cl. B60s 3/02; B08b 3/02

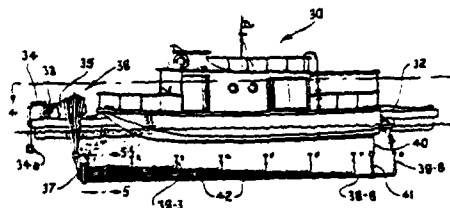
U.S. Cl. 134-123

1 Claim

Boat cleaning apparatus wherein submerged jets of water are caused to impinge upon submerged hull of boat. The jets are moved (e.g., rotated) or are turned on in sequence to contact the entire underwater structure.

Keywords: Fouling removal; Small-craft service structure

U.S. Cl. X.R. 114-222; 134-176; 134-181; 239-251; 239-563



3,773,550
INHIBITING DEGRADATION AND CORROSION OF
SOLID SUBSTRATES BY APPLICATION THERETO OF A
CURABLE COATING OF A POLYEPOXIDE AND AN
OXAZINE OR OXAZOLINE

Donald A. Tomalia, and Donald L. Schmidt, both of Midland,
Mich., assigns to The Dow Chemical Company, Midland,
Mich.

Filed May 3, 1971, Ser. No. 139,880
Int. Cl. B32b 15/08; C09d 3/58

U.S. Cl. 117—132 BE

2 Claims

A method of minimizing the degradative or corrosive effect
of ionic materials on solid substrate surfaces comprising coat-
ing such surfaces with a curable composition comprising es-
sentially (1) a polyeepoxide and (2) an oxazine or oxazoline
curing agent.

Keywords: Coating; Corrosion prevention

U.S. Cl. X.R. 117-1612B

No Figure

3,774,048
ENERGY GENERATING AND STORING ASSEMBLY FOR
MARINE STRUCTURE

Derek D. Hardingham, 1030 Crest View Dr., Seal Beach, Calif.
Filed Feb. 22, 1972, Ser. No. 228,037

Int. Cl. F03b 13/12

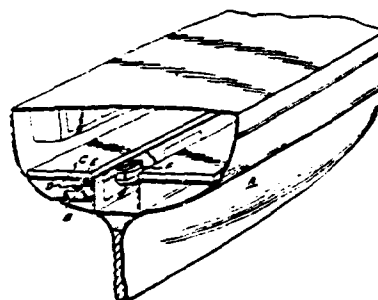
U.S. Cl. 290—42

13 Claims

A device and method of using same for transforming the
pitch and roll motion of a buoyant marine structure into storable
energy that is available for future use.

Keywords: Electrical generator; Power, wave

U.S. Cl. X.R. 114-39; 115-4; 290-53



NOVEMBER 27, 1973

3,774,323

COMPOSITE BUCKET-HYDRAULIC DREDGE

James E. Vaughan, Elma, Wash., assignor to
Vaughan Co. Inc., Montesano, Wash.

Filed May 14, 1971, Ser. No. 143,458

Int. Cl. E02f 3/92

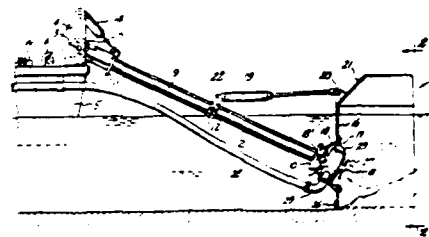
U.S. Cl. 37-58

5 Claims

A chopper hydraulic centrifugal pump in one wall of a boom-mounted dipper of either the scoop or backhoe or convertible type empties the dipper automatically. Such a dipper can be self-convertible to function as a scoop or as a backhoe by having opposite end wall openings selectively closable by an unstable flip-flop, self-reversing gate.

Keywords: Dredge, suction; Dredge intake;
Dredge ladder control; Pump;
Seabed grader

U.S. Cl. X.R. 37-71; 74-18.1



3,774,564

OCEANOGRAPHIC VEHICLE AND PLATFORM

Lewis A. Bordon, 90 Yantacaw Brook Rd., Upper Mountclair,
and Bruce B. Haselman, 71 Burki Pl., Freehold, both of N.J.

Continuation of Ser. No. 531,197, March 2, 1966. This

application July 25, 1967, Ser. No. 659,837

Int. Cl. B63b 35/00

U.S. Cl. 114-16 R

2 Claims

A surface and submersible oceanographic vehicle having an opposed paraboloidal hull configuration suitable for buoy and towing applications and capable of controlled excursions in response to surface vessel commands while under tow.

Keywords: Buoy, instrumented; Towed vehicle

U.S. Cl. X.R. 9-8R; 114-67R; 114-235R



3,774,570
NON-ROTATING DEPTH CONTROLLER PARAVANE
FOR SEISMIC CABLES

Raymond H. Pearson, Richardson, Tex., assignor to Whitehall Electronics, Richardson, Tex.

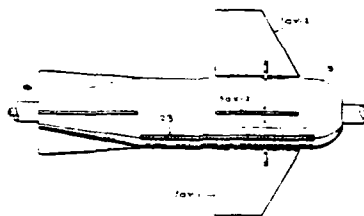
Filed Jan. 25, 1972, Ser. No. 220,592
Int. Cl. B63b 21:00

U.S. Cl. 114—235 B

13 Claims

A non-rotating depth controller paravane for seismic cable streamers wherein the paravane includes a body having a central bore extending the length thereof through which the seismic cable extends with the paravane latched in non-rotatable relation to the seismic cable. The paravane includes three or more pivotally mounted diving planes, four being shown in the illustrated example, and electronic circuitry and servo means for sensing differences between a command signal and a depth indicating signal derived from a pressure transducer on the paravane and activating the servo system to position the diving planes to cause the paravane to climb or dive regardless of its orientation about the roll axis and without movement of the paravane in yaw. Gravity sensing potentiometers vary the control signals to the servo system to activate the diving planes in this manner regardless of the orientation of the paravane about the roll axis.

Keywords: Depth pressure measurement;
Seismic streamer cable; Towed
body depth control



3,775,737
DEVICE FOR SENSING PRESSURE IN A LIQUID
MEDIUM

Jean Laurent, Yvelines, France, assignor to Institut Francais du Pétrole des Carburants et Lubrifiants, Rueil-Malmaison, Hauts-de-Seine, France

Filed Mar. 3, 1972, Ser. No. 231,676

Claims priority, application France, Mar. 3, 1971, 7107392
Int. Cl. G01v 1/16

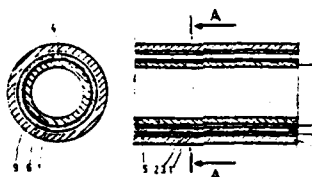
U.S. Cl. 340—7 R

10 Claims

A flexible seismic sensing cable includes cylindrically shaped piezoelectric sensing elements separated by cylindrically shaped insulating spaces along the longitudinal axis of the cable. Spirally-wound conductors are disposed concentrically within and around the sensing elements and spaces to provide a voltage pick-off. A protective tubular housing transparent to acoustic waves surrounds the outer conductors, while an inner tube, filled with a fluid for forcing the conductors against the sensing elements, is positioned against the inner conductors.

Keywords: Seismic hydrophone; Seismic
streamer cable

U.S. Cl. X.R. 340-10



3,775,738
**SELECTIVE SEQUENTIAL INPUT SWITCHING METHOD
 FOR SEISMIC SURVEYING**

Roy G. Quay, and William Harry Mayne, both of San Antonio, Tex., assignors to Petty Geophysical Engineering Company, San Antonio, Tex.

Filed Apr. 28, 1972, Ser. No. 248,535
 Int. Cl. G01v 1/38, 1/36

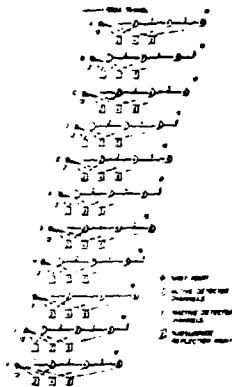
U.S. Cl. 340-7 R

20 Claims

A method of seismic data acquisition wherein a recording system may be provided with fewer recording channels as compared with the number of groups of seismic wave detectors of a seismic spread, such as a seismic streamer adapted to be towed by a vessel through bodies of water. Switching means is provided that is capable of switching the recorder channels to receive signals from selected groups of detectors in a predetermined sequence, such as the even numbered then odd numbered detector groups, for example on successive shots occurring at selected group spacing to yield multiple observations of subsurface points spaced at the same interval as the group spacing of the streamer detectors with significant reduction in the volume of digital tape and digital processing necessary for purposes of horizontal shot stacking.

Keywords: Seismic hydrophone array; Seismic record processor; Seismic survey method

U.S. Cl. X.R. 340-15.5CP; 340-15.5MC;
 346-33C



DECEMBER 4, 1973

3,775,982
ANTI-POLLUTION BARRIER
 Gilbert Andre Lamboley, Sartrouville, France, assignor to
 Etablissements Hutchinson Compagnie Nationale du
 Caoutchouc, Paris, France

Filed Apr. 18, 1972, Ser. No. 245,161

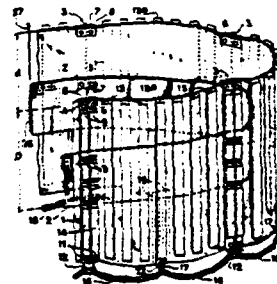
Claims priority, application France, Apr. 21, 1971, 7114187
 Int. Cl. E02b 15/04

U.S. Cl. 61-1 F

10 Claims

Anti-pollution barrier for aquatic regions comprising a watertight skirt and floats and ballast connected to the skirt. A longitudinal semi-rigid tension strip is rigidly fastened to the skirt at spaced apart points so as to form skirt segments which are longer than corresponding segments of the tension strip and constitute arch-shaped skirt portions. The strip is located substantially midway between the top and bottom edges of the skirt and is fastened to the skirt by a plurality of stiffening means at said points. Each stiffening means defines faces between which the strip is clamped against the skirt.

Keywords: Pollutant, surface barrier



DECEMBER 11, 1973

3,777,372

CUTTER SUCTION DREDGE HAVING
PARALLELOGRAM LINKAGE WAVE COMPENSATOR
Johannes Bertus Laarman, Swijndrecht, Netherlands, assignor
to N.V. Industriële Handelscombinatie Holland, Rotterdam,
Netherlands

Filed July 22, 1971, Ser. No. 165,125

Claims priority, application Netherlands, July 22, 1970,
7010848

Int. Cl. E02F 3/88

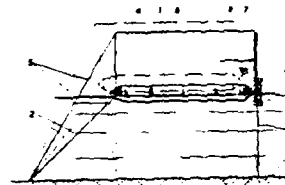
U.S. Cl. 37-64

3 Claims

A cutter dredge comprises a pontoon pivotally mounted on a spud driven into the sea bed, by means of a guide element vertically movable on the spud. The pontoon carries a cutter ladder pivotally on its end opposite the spud; and the lower end of the ladder is maintained at a predetermined elevation despite the wave motion of the spud and pontoon, by means of a parallelogram linkage having the pontoon as the lower side and having parallel sides upstanding from opposite ends of the pontoon and pivotally connected to the pontoon. The side of the parallelogram linkage at the cutter end of the pontoon is secured to the pontoon. The opposite side of the parallelogram linkage can be either a rod upstanding from the guide element, or a portion of the spud itself. The upper ends of the two upright sides are interconnected by a horizontal cable or stay.

Keywords: Dredge, cutterhead; Dredge ladder control

U.S. Cl. X.R. 37-72; 37-73



3,777,375

SUCTION DREDGE WITH BRUSH CUTTING
ATTACHMENT

Leward N. Smith, Millbrook Rd., Rt. 1, Remus, Mich.

Filed Jan. 28, 1972, Ser. No. 221,538

Int. Cl. E02F 3/90

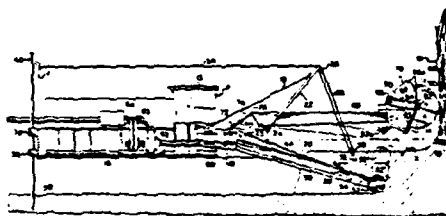
U.S. Cl. 37-67

20 Claims

Apparatus for excavating material such as earth, trees, brush, roots and the like, and removing it as a slurry, to make a lake or enlarge existing waterways, comprising: an underwater dredge having a material-removing cutterhead for digging and collecting material to be dredged which is movable in a to-and-fro, lateral path of travel, suction apparatus for removing the material from the cutterhead in slurry form and transferring it to a remote location, and a chipping wheel assembly movable with said cutterhead for removing an upper layer of earth, reducing the trees, roots, and brush to chips or pieces, and directing the reduced or comminuted material into the path of the cutterhead to be removed thereby to the remote location.

Keywords: Dredge, cutterhead; Dredge ladder control; Water plant removal

U.S. Cl. X.R. 114-175, 241-92; 241-296



3,777,376
**ARTICULATED LADDER CONSTRUCTION FOR
CUTTERHEAD DREDGE**

Thomas M. Turner, Severna Park; Francis J. Keefe, and
Charles D. Little, both of Baltimore, all of Md., assignors to
Ellicott Machine Corporation, Baltimore, Md.

Filed Feb. 4, 1972, Ser. No. 223,482

Int. Cl. E02f 3/90

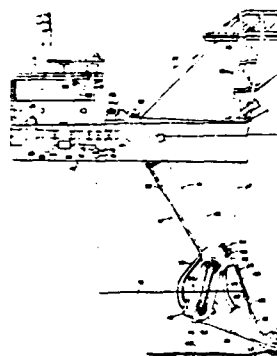
U.S. Cl. 37-67

9 Claims

An articulated ladder for a cutterhead dredge especially adapted for use in rough water and wherein the ladder, rather than being a unitary rigid member, is constructed in two parts connected together at adjacent ends by a link whereby the thrust due to wave action on the ladder part trunnioned to the dredge cannot be transmitted to the cutterhead and, by reaction of the latter against the bottom, back to the trunnions.

Keywords: Dredge, cutterhead; Dredge
ladder control; Pump

U.S. Cl. X.R. 37-72



3,777,377
METHOD OF COLLECTING SUBMARINE RESOURCES
Masatoshi Toritani, 4-26, Naritahigashi 5 chome, Suginami-
ku, Tokyo, Japan

Filed Oct. 27, 1971, Ser. No. 193,033

Int. Cl. E02f 1/00

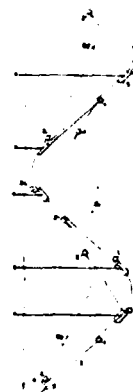
U.S. Cl. 37-195

4 Claims

The method of collecting submarine resources is practised by a collecting vessel provided with a pair of buckets which are adapted to be raised or lowered alternately. The vessel is steered so that a meandering wake is formed, and for every passage of the vessel around the turning point of the meandering wake, one of the buckets is lowered from the vessel toward the bottom of a river or sea and concurrently the other bucket is raised from the bottom to the vessel. While one of the buckets is on the vessel for collection of gathered resources therefrom, the other bucket is dredging through the bottom of the water for accumulating resources therein. The system for carrying out the method is provided with winch means for hoisting the two buckets simultaneously in opposite directions, that is, up and down.

Keywords: Dredge, mechanical; Sampler, seabed
grab

U.S. Cl. X.R. 37-71



3,777,494
WAVE ENERGY MOTORS

Alfred Soderlund, 1014 Forest Ave., Evanston, Ill.
Filed Jan. 10, 1972, Ser. No. 216,607
Int. Cl. F03c 5/00

U.S. Cl. 60-507

16 Claims

Wave energy is harnessed through pontoons riding on an ocean surface and guided for vertical movement to drive a vertical transmission bar reciprocably relative to a pair of parallel endless driving chains which are alternately driven by the reciprocating transmission bar to drive respective shafts rotatably, such shafts being coupled drivingly to a machine driving shaft carrying a flywheel for assuring uniform rotary motor power derived from the reciprocating power source motion. Fixed offshore platform and floating platform arrangements are provided.

Keywords: Power, wave

U.S. Cl. X.R. 115-4; 415-7



3,777,497
STORAGE TANK FOR OFFSHORE STORAGE OF LIQUID
AND METHOD OF CONSTRUCTING AND INSTALLING
SAME

Norman W. Edwards, Sewickley, Pa., assignor to Pittsburgh-Des Moines Steel Company, Pittsburgh, Pa.
Filed May 5, 1972, Ser. No. 250,732
Int. Cl. B65g 5/00

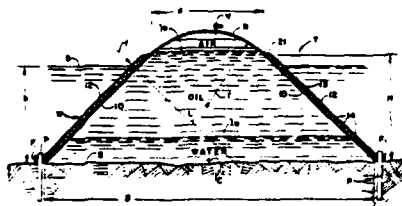
U.S. Cl. 61-46.5

17 Claims

A storage tank for offshore storage of liquid such as oil and the like and the method of constructing and installing same, wherein the storage tank has a side wall with the shape of a frustum of a hollow right circular cone and an enlarged diameter base or lower end and a reduced diameter top or upper end having a roof thereon, the frusto-conical configuration of the side wall of the tank substantially reducing the forces acting on the tank from a surrounding body of water or from wind or the like, and further resulting in a low center of gravity of the tank and a large water plane area so that the tank is inherently stable for towing in a body of water.

Keywords: Offshore storage tank, emergent;
Seabed foundation

U.S. Cl. X.R. 52-426; 220-10; 220-18



3,777,688

**METHOD AND APPARATUS FOR EMPLACEMENT OF
LONG BEAMS IN RUGGED SEA BOTTOM AREAS**

Alfred E. Melhose, Blairstown, N.J., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed June 25, 1970, Ser. No. 48,783

Int. Cl. B63b 35/00; E02b 17/00

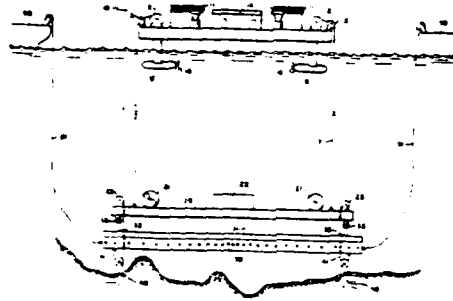
U.S. Cl. 114-0.5

5 Claims

A method and apparatus for accurate emplacement of mechanical long beams, such as those incorporating acoustic transducers, in rugged sea bottom areas.

Keywords: Embedment anchor; Instrument deployment

U.S. Cl. X.R. 61-46.5; 166-.5; 175-7;
114-206A



3,777,689

FLOATING BREAKWATER PONTOON

John O. Olsen, Lynnwood, and Gerrit A. Visser, Edmonds, both of Wash., assignors to Reid, Middleton & Associates, Inc., Edmonds and Poly Sintering, Inc., Seattle, both of Wash.

Filed Aug. 28, 1972, Ser. No. 284,454

Int. Cl. B63b 35/34

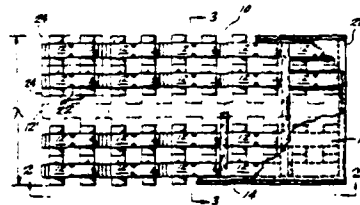
U.S. Cl. 114-.5 F

6 Claims

A low cost floating breakwater pontoon module adapted to nest with a large number of other similar pontoon modules, the modules preferably secured by structural members in an elongated rectangular array. The modules are hollow thin-walled sinter molded plastic pontoons which have unique indented peripheries such that when nested together in the breakwater array they will create a grid pattern of walls and openings extending into the upper portion of the wave to dissipate wave action by interference with the movement of fluid in the orbital flow under the wave crest.

Keywords: Breakwater, floating

U.S. Cl. X.R. 61-5



3,777,691

MARINE ELEVATOR

William George Beale, 640 Barnham Rd., West Vancouver, B. C., Canada

Filed Apr. 10, 1972, Ser. No. 242,441

Claims priority, application Great Britain, June 25, 1971, 29,822/71

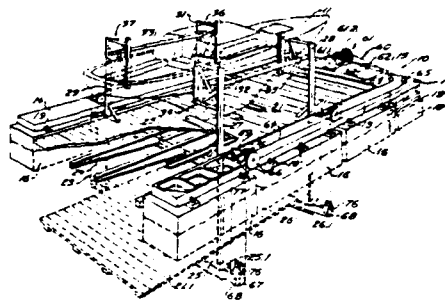
Int. Cl. B63c 1/02

U.S. Cl. 114-48

6 Claims

A marine elevator having a U-shaped, pontoon supported, frame into which a vessel to be lifted is moved and a winch operated cable supported platform mounted for vertical movement within the frame for lifting the vessel clear of the water. Vertical supports carried by the platform support the vessel, when lifted, in an upright position.

Keywords: Small-craft service structure



DECEMBER 18, 1973

3,779,020

IMMERSIBLE OIL FENCE ASSEMBLY

Tateo Muramatsu, and Kuninori Aramaki, both of Yokohama City, Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan

Filed Mar. 14, 1972, Ser. No. 234,579

Claims priority, application Japan, Mar. 20, 1971, 46/15685

Int. Cl. E02b 15/04

U.S. Cl. 61-1 F

12 Claims

An immersible oil fence assembly including alternately connected oil fence units and immersible buoys. The oil fence units have tubular float means connected to inflatable bags of the immersible buoys. By inflating and deflating the tubular float means and the inflatable bags, the oil fence is selectively floated and immersed. The buoys are anchored to station the oil fence assembly in position.

Keywords: Pollutant, surface barrier



AD-A080 796

COASTAL ENGINEERING RESEARCH CENTER FORT BELVOIR VA F/O 13/R
AN ANNOTATED BIBLIOGRAPHY OF PATENTS RELATED TO COASTAL ENGINE--ETC(U)
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CERC-79-79-1-VOL-2-APP ML

F/O 13/2

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2007/98

3,779,024

**STATIONARY STORAGE AND MOORING PLANT
RESTING ON THE BOTTOM OF THE SEA**

Gottfred Greve, Oslo, Norway, assignor to A/S Hoyer-Ellefsen,
Oslo, Norway

Filed June 21, 1971, Ser. No. 155,136

Claims priority, application Norway, June 23, 1970,
2442/70

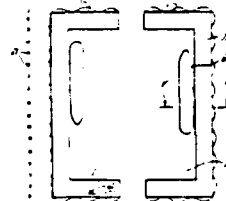
Int. Cl. E02b 17/00; E02d 5/00; B63b 35/02

U.S. Cl. 61-46

11 Claims

A stationary plant for servicing ships comprises a mooring structure resting on the bottom of the sea and projecting upwardly above the surface of the sea. The mooring structure extends around a central area to generally enclose that area to form a generally enclosed sheltered harbour having at least one entrance for vessels, and the mooring structure comprises at least one hollow water-tight caisson capable of storing a liquid such as oil, gas or the like.

Keywords: Breakwater, concrete; Offshore caisson; Offshore harbor; Offshore storage tank, emergent; Pier, fixed; Seabed foundation



3,779,027

**METHOD AND APPARATUS FOR A CONTINUOUS
DUMBBELL TUBE ANCHORING SYSTEM FOR
SUBMARINE PIPELINES**

Emmett J. Murphy, Woodside, Calif., assignor to Marcona
Corporation, San Francisco, Calif.

Filed Nov. 2, 1972, Ser. No. 302,995

Int. Cl. F16H 1/00; B65b 1/06

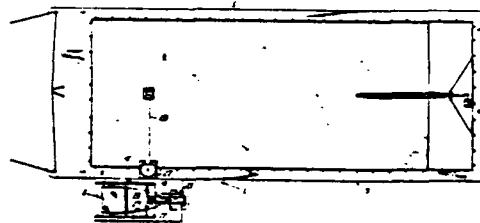
U.S. Cl. 61-72.1

14 Claims

A system for anchoring submarine pipelines by forming a continuous anchor having the shape of a dumbbell tube and constructed from an elongated envelope of plastic filter material which is seamed at sea and filled with ballast during its installation at its final position on the sea bottom. Alternatively, the dumbbell tube may be formed and filled with ballast and be installed continuously and simultaneously with the installation of the pipe sections comprising the submarine pipeline.

Keywords: Concrete form; Fabric mat; Seabed material placement; Seabed pipeline placement; Seabed scour protection

U.S. Cl. X.R. 61-46; 61-72.3; 141-10; 141-67



3,779,192

MODULAR CONCRETE FLOATATION UNIT

Paul S. Gonzalez, 12258 Buckingham Ave., Baton Rouge, La.

Filed Aug. 9, 1971, Ser. No. 169,968

Int. Cl. B63b 35/00

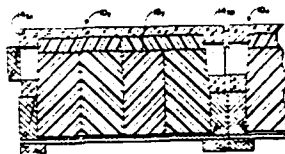
U.S. Cl. 114—0.5 F

15 Claims

A modular floatation unit useful in the construction of floating piers, boat houses, work platforms, docks, marinas, and the like, readily articulated and of particular utility in water bodies with frequent level changes. The modular floatation unit is comprised of the combination of a reinforced concrete channel slab having an upper flat side and a hollow or concave side, blocks of cellular foam or plastic wrapped in a protective covering or coated with a protective film packed within the hollow or concave side of the said slab, and an open wood frame secured to the underside of the concrete slab to hold the wrapped or coated blocks of cellular foam or plastic in place. The center of gravity of the modular floatation unit is located at a point wherein, in water, the upper flat side of the concrete slab will float above the surface, and provide a deck or walkway as well as protection for the wrapped blocks of cellular foam or plastic. The wood frame will be submerged where it will protect the blocks of cellular foam or plastic against impacts, and it is itself protected against deterioration.

Keywords: Pier, floating; Small-craft pier

U.S. Cl. X.R. 61-48; 114-0.5BD; 114-65A



DECEMBER 25, 1973

3,780,690

LINE-POST COUPLINGS AND MARINE MOORING-TOWING DEVICES

Welbourne D. McGahee, Melbourne, Fla., assignor to Loop A Line, Inc., Melbourne, Fla.

Filed Oct. 10, 1972, Ser. No. 296,107

Int. Cl. B63b 21/04

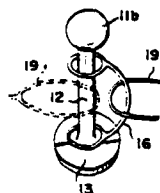
U.S. Cl. 114—218

17 Claims

Line-post couplings with marine mooring-towing and other applications having a post with an enlarged head and with mounting members including a fixed or movable clevis member whereby a line with a loop may be quickly attached and detached without the necessity of tying and untying knots. The enlarged head may be integral with the post or detachable. The clevis may include a pair of rings and be movable on the post or one ring may be omitted and the lower clevis end affixed to the post or post base. A line anti-fraying member may also be affixed to the clevis. A device may be mounted on a tow truck, dock, or a boat, and with slight modification the device may be mounted on dock pilings and bollards or lock walls with or without a float member.

Keywords: Small-craft mooring device

U.S. Cl. X.R. 24-115K; 24-123H



3,780,975
MEANS FOR PRODUCING CAST-IN-PLACE
STRUCTURES IN SITU

Lee A. Turzillo, 2078 Glengary Rd., Akron, Ohio
Filed Nov. 23, 1971, Ser. No. 203,103
Int. Cl. E02d 5/60

U.S. Cl. 249—1

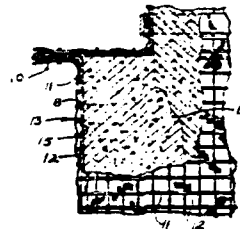
4 Claims

Laminated sheet material, and apparatus utilizing the same, for producing and/or repairing structural bodies of self-hardening fluid cementitious material in a sub-aqueous and/or subterranean situs. Sheet material includes wire-mesh backing, and porous fabric bonded thereto, substantially without blocking of fabric pores, and is adapted for supplying in rolls or sheets to be cut and selectively formed at the situs into matrices or molds having body-forming cavities for producing or repairing concrete structures of many shapes and sizes.

The apparatus includes such laminated sheeting formed as a substantially rigid matrix, suitably reinforced and/or anchored at the situs to have porous fabric layers presented inwardly, to define matrix cavity walls backed by the openwork material. Fluid cementitious material supplied to the matrix cavity adapted to harden into structural body corresponding to shape of matrix cavity, after which matrix can be readily removed therefrom.

Keywords: Concrete form; Fabric mat; Offshore construction; Structure repair

U.S. Cl. X.R. 61-54; 249-113; 249-134;
425-DIG.36; 425-DIG.126



3,781,775
ROTATING STEREO SONAR MAPPING AND
POSITIONING SYSTEM
Richard J. Malloy, Ojai, and Robert D. Hitchcock, Ventura,
both of Calif., assignors to The United States of America as
represented by the Secretary of the Navy, Washington, D.C.
Filed May 1, 1972, Ser. No. 249,330
Int. Cl. G01s 9/06

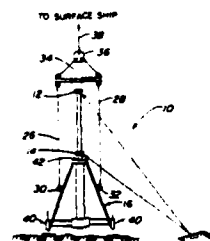
U.S. Cl. 340—3 R

4 Claims

A stereo sonar system comprising a pair of pulsed sonar transducers mounted one above the other on a stationary bottom frame. The transducers are rotated as a unit but are spaced sufficiently to produce a three dimensional figure when stereo viewed.

Keywords: Instrument deployment; Seabed site survey; Sonar, side looking

U.S. Cl. X.R. 340-5MP; 340-8S



3,781,778

MARINE STREAMER CABLE

Frederick C. Sawin, and William A. Whitfill, Jr., both of Houston, Tex., assignors to Schlumberger Technology Corporation, New York, N.Y.

Filed Apr. 19, 1972, Ser. No. 245,330
Int. Cl. G01v 1/16

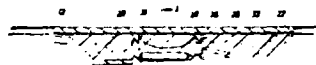
Keywords: Seismic streamer cable

U.S. Cl. X.R. 174-101.5

U.S. Cl. 340-7 R

12 Claims

In accordance with an illustrative embodiment of the present invention, a marine streamer cable of layered solid construction includes a cable core with a stress member and electrical conductors extending eccentrically within a tubular flotation body. Seismic transducer assemblies are provided at spaced points along the cable with each assembly including a rigid case construction that houses a disc-type hydrophone to the side of the core and within the circumferential outline of the flotation body.



4. Reissued Patents

1971 to 1973

Re. 27,090 to Re. 27,640

Note: Matter enclosed in heavy brackets [] appears in the original patent but forms no part of the reissued specification; matter printed in italics indicates the additions made by reissue.

Re. 27,090

INDIVIDUAL DRY DOCK FOR BOATS

Henry A. Rutter, Rte. 1, Euchla, Okla. 74342
Original No. 3,362,172, dated Jan. 9, 1968, Ser. No. 435,816, Mar. 1, 1965, Application for reissue Nov. 6, 1969, Ser. No. 871,497

Int. Cl. B63c 1/06; E02c 3/00

U.S. Cl. 61-65

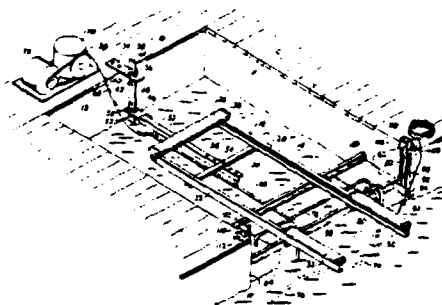
10 Claims

Reissued Mar. 23, 1971

Keywords: Small-craft service structure

U.S. Cl. X.R. 6-48; 61-67

An individual dry dock particularly for relatively small water craft wherein a movable frame is pivotally and vertically reciprocally mounted in a boat well filled with water. In a lowered position of the frame the boat may be floated thereon and pontoons are provided for the frame which may be filled with air in order to elevate the frame and boat to a position out of the water. Conversely, air may be withdrawn from the pontoon for lowering the frame and boat into the water.



Re. 27,292

APPARATUS FOR SUBMARINE CORE DRILLING

Pierre Grolet, Pierre Moulin, and Jean Parola, Rueil Malmaison, France, assignors to Institut Français du Pétrole des Carburants et Lubrifiants, Rueil Malmaison, France

Original No. 3,370,656, dated Feb. 27, 1968, Ser. No. 510,285, Nov. 29, 1965. Application for reissue Feb. 27, 1970, Ser. No. 15,305

Int. Cl. E21b 7/12

U.S. Cl. 175—6

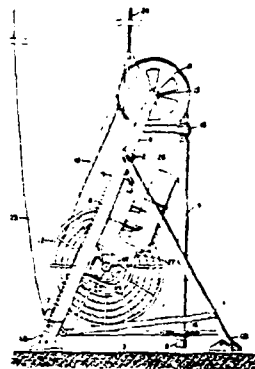
5 Claims

A submarine core drilling apparatus comprising a basic structure which is suspended by a supporting cable from the surface installation. A flexible conduit is wound upon a storage reel which in turn is carried by the basic structure. The free end of the conduit is connected to a rigid tubular part comprising a bottom motor operatively connected to a core drill at its lower end. The apparatus further comprises means for guiding the rigid tubular part above the sea bottom, means supported by the basic structure for feeding water under pressure into the conduit, means associated with the conduit storage reel to control the unwinding of the flexible conduit when the core drill is lowered and advanced into the underwater strata, and at least one cable which may or may not be distinct from the supporting cable. This cable contains electric power and has control and command conductors connected to a source of electric energy and a switchboard on the surface installation.

Reissued Feb. 22, 1972

Keywords: Instrument deployment; Sampler, power supply; Sampler, seabed-drilled core

U.S. Cl. X.R. 175-22



Re. 27,308

UNDERWATER LOW TEMPERATURE SEPARATION UNIT

John R. Leonard, Houston, Tex., assignor to Mobil Oil Corporation

Original No. 3,384,169, dated May 21, 1968, Ser. No. 550,705, May 17, 1966. Application for reissue Apr. 8, 1970, Ser. No. 26,477

Int. Cl. E21b 43/01, 39/00

U.S. Cl. 166—5

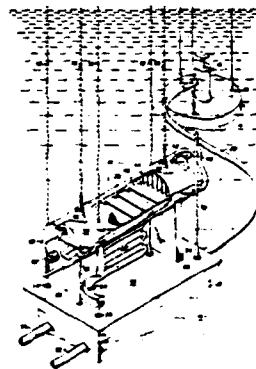
18 Claims

An apparatus involving an underwater separator assembly comprising a landing base and a removable separator which mates therewith. The base is adapted to be affixed to the marine bottom and be connected through a first flowline means to a producing well and through one or more additional flowlines to production facilities. The separator which has an inlet adapted to be releasably connected to said first flowline and one or more outlets adapted to be releasably coupled to said additional flowlines, respectively, is lowered on guide means to the base and is mated therewith.

Reissued Mar. 14, 1972

Keywords: Seabed foundation; Seabed oil, process structure

U.S. Cl. X.R. 166-267



Re. 27,318

DOCK FENDER

Joseph R. Gensheimer, Erie, Pa., assignor to Lord Corporation, Erie, Pa.
Original No. 3,172,268, dated Mar. 9, 1965, Ser. No. 356,364, Mar. 30, 1964, which is a continuation-in-part of Ser. No. 140,036, Sept. 22, 1961. Application for reissue Sept. 25, 1970, Ser. No. 75,796
Int. Cl. E02b 3/22; F16f 7/12

U.S. Cl. 61—48

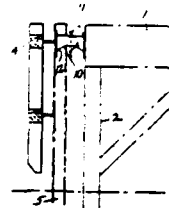
6 Claims

A fender extends along and is spaced in front of and presented to an edge of a dock and has means supporting the same for movement toward and away from and along the dock. A plurality of mountings are spaced along and extend between the fender and the edge of the dock and each comprises a generally horizontally extending body of elastomer in the form of a column having length, width and thickness. Each body is arranged with its width extending along the edge of the dock and its length extending out from the edge of the dock. A plate is fastened to each end of the body with one plate being attached to the fender and the other to the edge of the dock. The greater ratio of the length to the minimum width and of the length to the minimum thickness is at least substantially two whereby the body will sustain load from the fender in compression until the load reaches a threshold and will thereafter buckle with further deflection without a substantial increase in load.

Reissued Mar. 28, 1972

Keywords: Pier fender

U.S. Cl. X.R. 248-358; 267-63; 267-140; 267-141



Re. 27,452

FLOATING BOOMS

Millard F. Smith, Westport, Conn.
(P.O. Box 295, Saugatuck, Conn. 06880)
Original No. 3,499,290, dated Mar. 10, 1970, Ser. No. 739,452, June 24, 1968. Application for reissue Apr. 8, 1971, Ser. No. 132,345
Int. Cl. E02b 3/04, 15/04

U.S. Cl. 61—1 F

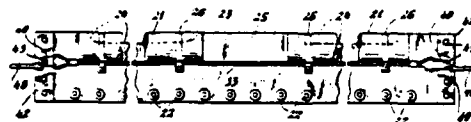
15 Claims

A portable flexible floating boom for confining oil or other material floating on the water, or as a current or wave controlling or inhibiting breakwater, groin, jetty, or the like, or for protecting beaches from harmful marine creatures, the boom incorporating a series of elongated floats of foamed elastomer connected in longitudinally spaced end-to-end relation by a continuous underwater barrier in the form of a water-impervious flexible polymer fin depending from and supported by the floats substantially in the central longitudinal vertical plane of the floats, the barrier being extended at its ends beyond the two end floats of the boom and having end plates secured thereto for connection of towing or anchoring lines, the upper edge of the barrier between the floats and along its extended ends being substantially level with the upper sides of the floats, and each of the floats having a series of longitudinally spaced yoke-like metal straps embracing its upper side in imbedded non-projecting snag-proof relation, the sides of the straps converging beneath the floats with their ends clamped upon opposite sides of the barrier fin, whereby the barrier fin is supported by the straps in suspended relation beneath the floats. A reinforcing cable extends the length of the boom at one side of the barrier fin adjacent the undersides of the floats and is anchored at its ends to the end plates,

Reissued Aug. 1, 1972

Keywords: Breakwater, floating; Groin; Low-cost shore protection; Pollutant, surface barrier

supporting clips being swaged to grip the cable in correspondingly spaced relation to the longitudinal spacing of the barrier fin supporting straps along the boom, each clip being clamped between one side of the barrier and one end of each respective strap. It is also contemplated that an auxiliary barrier, which may be in the form of a water-pervious net or the like of suitable extent may be suspended from the cable to extend to any desired depth in the water below the water-impervious barrier fin.



Re. 27,460

**METHOD FOR ENCASING RIGID MEMBERS
WITH CONCRETE**

Bruce A. Lamberton, Berea, Ohio
(Box 5951, Cleveland, Ohio 44101)

Original No. 3,397,260, dated Aug. 13, 1968, Ser. No. 657,455, June 26, 1967, which is a continuation of Ser. No. 486,786, Sept. 13, 1965, and a continuation-in-part of Ser. No. 446,346, Apr. 7, 1965. Application for re-issue July 30, 1970, Ser. No. 59,589

Int. Cl. B28b 1/26

U.S. Cl. 264—86

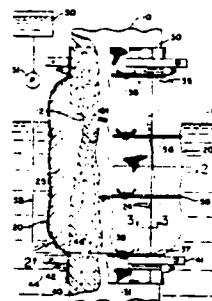
13 Claims

A form comprised of a sleeve of flexible porous material is positioned around an elongated rigid member with the ends of the sleeve pressed against the members to form a space between the form and the material. A cementitious slurry of a known liquid-cement ratio is pumped into the space until a pressure is built up and the form is inflated. The pumping is continued until some of the liquid in the slurry passes outwardly through the pores of the fabric and the liquid-cement ratio is lowered.

Reissued Aug. 15, 1972

Keywords: Concrete form; Pile protection;
Structure repair

U.S. Cl. X.R. 264-31; 264-35; 264-36



Re. 27,526

**METHOD AND DEVICE FOR DETERMINING THE
CONVEY CONCENTRATION OF DREDGING
SPOIL OF A SUSPENSION OF DREDGING SPOIL
AND WATER**

Romke van der Veen, Jutphaas, Netherlands, assignor to
N.V. Ingenieursbureau Voor Systemen en Octrooien
"Spanstaal," Rotterdam, Netherlands

Original No. 3,554,011, dated Jan. 12, 1971, Ser. No. 817,999, Apr. 21, 1969. Application for reissue July 19, 1971, Ser. No. 164,155

Claims priority, application Netherlands, Apr. 24, 1968,
6805779

Int. Cl. G01n 9/26, 15/06

U.S. Cl. 73—61 R

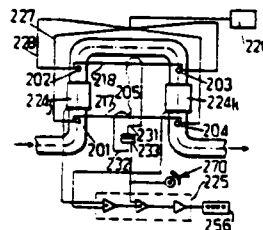
8 Claims

A system for measuring the concentration of a dredging spoil suspension wherein the suspension is caused to flow vertically upwards and vertically downwards in two pipe sections. Upper and lower conduits are coupled between corresponding upper and lower points on the two vertical pipe sections, and a pressure pickup is obtained between the midpoints of the upper and lower conduit.

Reissued Nov. 28, 1972

Keywords: Dredge-spoil measurement

U.S. Cl. X.R. 73-438



Re. 27,529

GALVANIC ANODE

Gordon L. Doremus, 7555 Haywood Drive 77017, and Jack G. Davis, 3600 Montrose, Apt. 405 77006, both of Houston, Tex.

Original No. 3,616,422, dated Oct. 26, 1971, Ser. No. 817,916, Apr. 21, 1969. Application for reissue Aug. 7, 1972, Ser. No. 277,381

Int. Cl. C23f 13/00

U.S. Cl. 204-197

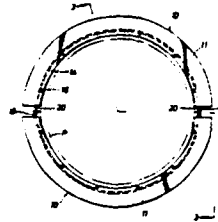
14 Claims

A galvanic anode adapted particularly for the cathodic protection of relatively large diameter pipelines submerged in water bodies. The anode consists of at least a pair of [semicylindrical] arcuate segments constructed of a suitable galvanic metal and having completely embedded within the galvanic metal steel core or armature sections, adapted to be connected together to join the anode sections into a "bracelet" about the pipe.

Reissued Dec. 12, 1972

Keywords: Cathodic protection; Corrosion prevention

U.S. Cl. X.R. 204-286



Re. 27,535

METHOD AND DEVICE FOR DETERMINING THE QUANTITY OF DREDGING SPOIL TO BE PAID

Romke van der Veen, Jurphaas, Netherlands, assignor to N.V. Ingenieursbureau voor Systemen en Octrooien "Spanstaal," Rotterdam, Netherlands

Original No. 3,554,009, dated Jan. 12, 1971, Ser. No. 817,691, Apr. 21, 1969. Application for reissue July 19, 1971, Ser. No. 164,153

Claims priority, application Netherlands, Apr. 24, 1968, 6805777

Int. Cl. G01n 9/26, 15/06

U.S. Cl. 73-61 R

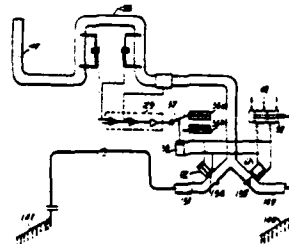
15 Claims

A method and apparatus are disclosed for measuring the quantity of dredging spoil. A flow of the spoil and water is guided vertically upwards along a first flow section and downwards along a second flow section. Pressure differentials between vertically spaced points on each flow section are obtained and added. The product of the pressure differential and flow velocity is integrated during the period in which the dredging spoil is being conveyed.

Reissued Dec. 26, 1972

Keywords: Dredge-spoil measurement

U.S. Cl. X.R. 73-438



Re. 27,536

METHOD AND SUCTION DREDGING INSTALLATIONS FOR CONVEYING DREDGING SPOIL

Romke van der Veen, Jutphaas, and Jan de Koning, Amsterdam, Netherlands, assignors to N.V. Ingenieursbureau voor Systemen en Octrooien "Spanstaal," Binnenweg, Rotterdam, Netherlands

Original No. 3,554,010, dated Jan. 12, 1971, Ser. No. 817,692, Apr. 21, 1969. Application for reissue July 19, 1971, Ser. No. 164,154

Claims priority, application Netherlands, Apr. 24, 1968, 6805778

Int. Cl. G01n 9/26, 15/06

U.S. Cl. 73-61 R

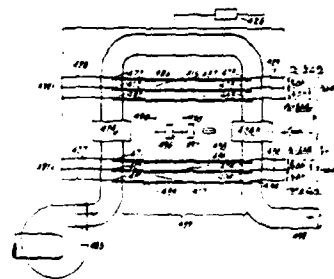
22 Claims

In a method and apparatus for measuring the quantity of a suspension of dredging spoil and water, means are provided to compensate for the presence of air in the suspension. The measure compensation is derived by taking pressure measurements of at least two flow sections in the system at which the prevailing pressures are different.

Reissued Dec. 26, 1972

Keywords: Dredge-spoil measurement

U.S. Cl. X.R. 73-438



Re. 27,640

INFLATABLE FLOAT BOOM

Campbell F. Logan, 530 Goodwin St., Jacksonville, Fla. 32204

Original No. 3,494,132, dated Feb. 10, 1970, Ser. No. 757,849, Sept. 6, 1968. Application for reissue Sept. 25, 1970, Ser. No. 75,556

Int. Cl. E02b 15/04

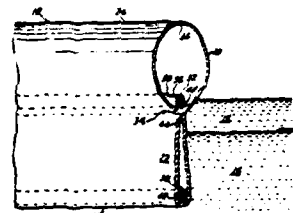
U.S. Cl. 61-1 F

17 Claims

An inflatable float boom having a pair of elongated selectively inflatable tubes connected throughout their lengths by a joining web and a pair of elongated hollow members filled with particulate solids are disposed within respective tubes, such members being free to fall into the lower side portions of respective tubes. A separate gas valve is connected to each tube so that one tube can be inflated to float the boom on the surface of the liquid and the deflated tube functioning as a depending skirt therefore. A sleeve is provided between the end portions of the tubes to bridge the gap and to surround the releasable connectors therebetween.

Reissued May 8, 1973

Keywords: Pollutant, surface barrier



5. Additional Referenced Reissued Patents

The following reissued patents published between the end of 1973 and the end of 1976 are revisions of original patents in this volume. These reissued patents are not included in the annotations or subject index in this volume. Listed below are key information referencing the reissued patent to the original patent and new material added to or replacing information in this volume's annotation for the original patent. Complete annotations for these reissued patents are in the volume for the years the revisions were published.

Re. 28,232

METHODS OF GROUTING OFFSHORE STRUCTURES

Max Bassett, Houston, Tex., and Horace W. Olsen, deceased, late of Houston, Tex., by Magdalene M. Olsen, executrix, Houston, Tex., assignors to C. Nelson Shields, Jr., trustee

Original No. 3,601,999, dated Aug. 31, 1971, Ser. No. 858,951, Sept. 18, 1969. Application for reissue July 11, 1973, Ser. No. 378,196

Int. Cl. E02b 17/00; E02d 5/24

U.S. Cl. 61—46

15 Claims

Reissued Nov. 5, 1974

Added U.S. Cl. X.R. 61-53.52; 61-53.6

A method for grouting the annulus between the jacket and piling in the legs of an offshore structure in which air is introduced to expel water from the lower end of the annulus, and the annulus is then filled from the top with grouting material. Air pressure may be maintained in the annulus sufficient to prevent ingress of water through the lower end of the jacket while grouting material is being introduced.

[Compressed air is introduced into an annular space existing between the jacket and piling in the legs of an offshore structure so that water is expelled from the annular space through the lower end of the jacket and grouting material is then introduced into the annular space. The introduction of compressed air and grouting material is effected from above the waterline, thus avoiding the necessity of performing the grouting operation by divers at the sea bed.]

Re. 28,332

METHOD AND APPARATUS FOR PREVENTING ICE DAMAGE TO MARINE STRUCTURES

Joseph F. Schirtzinger, Pasadena, Calif., assignor to Sea-Log Corporation, Pasadena, Calif.

Original No. 3,669,052, dated June 13, 1972, Ser. No. 46,273, June 15, 1970. Application for reissue Oct. 25, 1973, Ser. No. 409,747

Int. Cl. B63b 35/08

U.S. Cl. 114—5 R

15 Claims

Reissued Feb. 11, 1975

Added Keyword: Offshore platform, leg

Re. 28,966

SYSTEM AND BARRIER FOR CONTAINING AN OIL SPILL

Thomas Nicholas Blockwick, McLean, Va., assignor to Ocean Systems, Inc., Reston, Va.

Original No. 3,708,982, dated Jan. 9, 1973, Ser. No. 79,997, Oct. 21, 1970. Application for reissue Jan. 24, 1974, Ser. No. 436,146

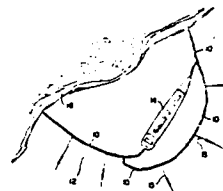
Int. Cl. E02b 15/04

U.S. Cl. 61—1 F

19 Claims

Reissued Sept. 21, 1976

Added U.S. Cl. X.R. 210-83



Re. 28,989

ELECTROMAGNETIC WATER CURRENT METER

Vincent J. Cushing, 9804 Hillridge Drive, Kensington, Md. 20795

Original No. 3,759,097, dated Sept. 18, 1973, Ser. No. 68,674, Sept. 1, 1970. Application for reissue Dec. 10, 1974, Ser. No. 531,418

Int. Cl. G01F 1/58

U.S. Cl. 73—194 EM

22 Claims

Reissued Oct. 5, 1976

III. SUBJECT INDEX, 1971-73

ARTIFICIAL SEAWEEED

- 3559407 ARTIFICIAL SEAWEEED
OTHER KEYWORDS: SEABED SCOUR PROTECTION
- 3590585 COMPOSITE STRUCTURE
- 3648464 METHOD AND MEANS FOR PLACING ARTIFICIAL SEAWEEED
OTHER KEYWORDS: EMBEDMENT ANCHOR ; SEABED MATERIAL PLACEMENT
- 3716998 MEANS FOR NEUTRALIZING SUBMARINE EROSION
OTHER KEYWORDS: FABRIC MAT ; LOW-COST SHORE PROTECTION
- 3727411 INFLUENCING SEDIMENTATION
OTHER KEYWORDS: LOW-COST SHORE PROTECTION

ASPHALT

- 3625014 METHOD AND APPARATUS FOR UNDERWATER DEPOSITION OF SETTABLE MATERIALS
OTHER KEYWORDS: CONCRETE FORM ; SEABED MATERIAL PLACEMENT ;
SLOPE PROTECTION
- 3635033 BITUMINOUS COMPOSITIONS IN HYDRAULIC CONSTRUCTIONS
OTHER KEYWORDS: BREAKWATER, PILE ; GROUTING ; REVEINMENT

BAR PROTECTION

- 3564853 METHOD OF CONTROLLING EROSION ON SEASHORES
OTHER KEYWORDS: FABRIC MAT ; GROIN ; LOW-COST SHORE PROTECTION
- 3670304 FABRIC CONTAINMENT CONSTRUCTIONS
OTHER KEYWORDS: BREAKWATER, CONCRETE ; CONCRETE FORM ; FABRIC MAT ;
OFFSHORE CONSTRUCTION

BATHYTHERMOGRAPH

- 3561267 BATHYTHERMOMETER
OTHER KEYWORDS: INSTRUMENT DEPLOYMENT
- 3561268 EXPENDABLE BATHYTHERMOGRAPH
OTHER KEYWORDS: INSTRUMENT DEPLOYMENT
- 3587310 HOLLOW CORE INSTRUMENT CABLE
OTHER KEYWORDS: INSTRUMENT CABLE ; INSTRUMENT DEPLOYMENT
- 3596512 EXPENDABLE AIR PROBE
OTHER KEYWORDS: INSTRUMENT, AIRBORNE ; INSTRUMENT DEPLOYMENT
- 3656345 AUTOMATIC FREE-FALL OCEANOGRAPHIC TEMPERATURE PROBE
OTHER KEYWORDS: INSTRUMENT DEPLOYMENT ; INSTRUMENT RETRIEVAL
- 3670572 AIR-SEA INTERFACE TEMPERATURE MEASURING APPARATUS
OTHER KEYWORDS: BUOY, INSTRUMENTED ; INSTRUMENT DEPLOYMENT
- 3748899 CONDUCTIVITY AND TEMPERATURE SENSING PROBE
OTHER KEYWORDS: INSTRUMENT DEPLOYMENT ; SALINITY MEASUREMENT

BREAKWATER, CONCRETE

- 3640075 METHOD OF INSTALLING BREAKWATER CAISSONS
OTHER KEYWORDS: OFFSHORE CAISSON ; OFFSHORE CONSTRUCTION ; SEAWALL
- 3653216 METHOD AND APPARATUS FOR PREVENTING EROSION
OTHER KEYWORDS: WAVE ABSORBER BEACH

3670504 FABRIC CONTAINMENT CONSTRUCTIONS
OTHER KEYWORDS: RAR PROTECTION ; CONCRETE FORM ; FABRIC MAT ;
OFFSHORE CONSTRUCTION

3726950 METHOD FOR PRODUCING SUB-AQUEOUS AND OTHER CAST-IN-PLACE CONCRETE
STRUCTURES IN SITU. OTHER KEYWORDS: BULKHEAD ; CONCRETE FORM ;
FABRIC MAT ; OFFSHORE CONSTRUCTION ; PILE, CONCRETE ;
STRUCTURE REPAIR

3733831 METHOD AND APPARATUS FOR PREVENTING EROSION AND FOR CONVEYING
OTHER KEYWORDS: SEABED FOUNDATION ; WAVE ABSORBER BEACH

3779024 STATIONARY STORAGE AND MOORING PLANT RESTING ON THE BOTTOM
OF THE SEA. OTHER KEYWORDS: OFFSHORE CAISSON ; OFFSHORE HARBOR ;
OFFSHORE STORAGE TANK, EMERGENT ; PIER, FIXED ; SEABED FOUNDATION

BREAKWATER, FLOATING

3595026 BREAKWATER

3628334 FLOATING BREAKWATER
OTHER KEYWORDS: BUOY MOORING SYSTEM ; EMBEDMENT ANCHOR

3673805 FLOATABLE BREAKWATER ELEMENT

3691773 WATER BARRIER FLOTATION CURTAIN
OTHER KEYWORDS: POLLUTANT DEBRIS ; POLLUTANT, SUBMERGED BARRIER ;
POLLUTANT, SURFACE BARRIER

3691774 TRANSPORTABLE BREAKWATER
OTHER KEYWORDS: BUOY MOORING SYSTEM

3712068 OFFSHORE INSTALLATION FOR PRODUCING, STORING AND LOADING OIL
FROM UNDERWATER OIL WELL. OTHER KEYWORDS: OFFSHORE MOORING STRUCTURE ;
OFFSHORE PLATFORM ANCHOR ; OFFSHORE PLATFORM, FLOATING ;
OFFSHORE STORAGE TANK, SUBMERGED

3777689 FLOATING BREAKWATER PONTOON

RE27452 FLOATING BOOMS
OTHER KEYWORDS: GROIN ; LOW-COST SHORE PROTECTION ;
POLLUTANT, SURFACE BARRIER

BREAKWATER, RUBBLE

3562917 APPARATUS FOR MEASURING IRREGULAR SURFACES OF DEPOSITS
OF CONCRETE BLOCKS OR RUBBLE MOUNDS. OTHER KEYWORDS:
CONCRETE ARMOR UNIT ; SEABED SITE SURVEY ; STRUCTURE INSPECTION

3568449 CONSTRUCTION OF LAND MASSES BOUNDED BY WATER
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE ISLAND

3635033 BITUMINOUS COMPOSITIONS IN HYDRAULIC CONSTRUCTIONS
OTHER KEYWORDS: ASPHALT ; GROUTING ; REVETMENT

3680320 OFF-SHORE TRANSPORTATION, INDUSTRIAL AND URBAN COMPLEX
OTHER KEYWORDS: OFFSHORE HARBOR ; OFFSHORE ISLAND

BREAKWATER, STEEL FRAME

3611727 WAVE-FORMING STRUCTURE

BULKHEAD

3570252 CONSTRUCTIONAL WORKS

3570253 CONSTRUCTIONAL WORKS

3657896 METHOD OF CONSTRUCTING CONTINUOUS WALL BY USE OF PILES
OR PILE SHEETS AND APPARATUS THEREFOR.OTHER KEYWORDS:
OFFSHORE CONSTRUCTION ; PILE DRIVER, IMPACT ; PILE DRIVER LEADS ;
PILE PLACEMENT

3665717 METHOD AND APPARATUS FOR INSTALLING ELONGATED RODS
IN UNSTABLE EARTH FORMATIONS.OTHER KEYWORDS: GROUTING

3686873 CONSTRUCTIONAL WORKS

3726950 METHOD FOR PRODUCING SUB-AQUEOUS AND OTHER CAST-IN-PLACE CONCRETE
STRUCTURES IN SITU.OTHER KEYWORDS: BREAKWATER, CONCRETE ;
CONCRETE FORM ; FABRIC MAT ; OFFSHORE CONSTRUCTION ;
PILE, CONCRETE ; STRUCTURE REPAIR

3739588 RESILIENT RETAINING WALL
OTHER KEYWORDS: PILE SECTION CONNECTION ; PILE, SHEET ; PILE, STEEL

3753354 CORROSION-PROTECTED ANCHORING RODS FOR ANCHORING STRUCTURAL PARTS
IN THE EARTH, AS WELL AS METHOD OF PRODUCING ANCHORINGS WITH
CORROSION-PROTECTED ANCHOR RODS.OTHER KEYWORDS:
CORROSION PREVENTION ; GROUTING

BUOY MOORING SYSTEM

3559223 LONG SPAR BUOY CONSTRUCTION AND MOORING METHOD
OTHER KEYWORDS: BUOY, INSTRUMENTED

3590408 ANCHORING DEVICE FOR A FLOATING BUOY
OTHER KEYWORDS: INSTRUMENT CABLE

3590635 PYCNOCLINE FOLLOWER APPARATUS
OTHER KEYWORDS: BUOY, INSTRUMENTED ; DEPTH PRESSURE MEASUREMENT ;
INSTRUMENT DEPLOYMENT

3597778 MOORING DEVICES
OTHER KEYWORDS: INSTRUMENT DEPLOYMENT

3628205 OCEANOGRAPHIC SURVEY DEVICE
OTHER KEYWORDS: BUOY, INSTRUMENTED ; INSTRUMENT DEPLOYMENT ;
INSTRUMENT RETRIEVAL

3628334 FLOATING BREAKWATER
OTHER KEYWORDS: BREAKWATER, FLOATING ; EMBEDMENT ANCHOR

3631550 MOORING DEVICES
OTHER KEYWORDS: BUOY, INSTRUMENTED ; INSTRUMENT DEPLOYMENT

3680160 FLOAT FOR SEAMARKS, BUOYS, PONTOONS AND THE LIKE
OTHER KEYWORDS: ICE PROTECTION ; PIER, FLOATING ;
SMALL-CRAFT MOORING DEVICE

3691774 TRANSPORTABLE BREAKWATER
OTHER KEYWORDS: BREAKWATER, FLOATING

3695207 ANCHORAGE FOR BOAT DOCK, BUOY OR THE LIKE
OTHER KEYWORDS: PIER, FLOATING ; SMALL-CRAFT PIER

3705431 MOORING DEVICES
OTHER KEYWORDS: BUOY, INSTRUMENTED ; INSTRUMENT DEPLOYMENT

3728748 MOORING APPARATUS
OTHER KEYWORDS: BUOY, INSTRUMENTED

3729755 IMPROVEMENTS RELATING TO RELEASE MECHANISM FOR BUOYS
 OTHER KEYWORDS: BUOY, INSTRUMENTED ; INSTRUMENT DEPLOYMENT

3742535 OPEN OCEAN SHALLOW WATER MOOR
 OTHER KEYWORDS: INSTRUMENT DEPLOYMENT

3754439 OCEANOLOGICAL AND METEOROLOGICAL STATION
 OTHER KEYWORDS: BUOY, INSTRUMENTED ; INSTRUMENT DEPLOYMENT

BUOY, INSTRUMENTED

3556035 SAILING VESSEL

3559223 LONG SPAR BUOY CONSTRUCTION AND MOORING METHOD
 OTHER KEYWORDS: BUOY MOORING SYSTEM

3569725 WAVE-ACTUATED POWER GENERATOR-BUOY
 OTHER KEYWORDS: ELECTRICAL GENERATOR ; INSTRUMENT POWER SUPPLY ;
 POWER, WAVE ; PUMP

3570437 MULTI-CYCLE OCEAN DATA GATHERING SYSTEM
 OTHER KEYWORDS: INSTRUMENT DEPLOYMENT

3585952 SELF RIGHTING VESSEL

3590406 LONG SPAR BUOY

3590635 PYCNOCLINE FOLLOWER APPARATUS
 OTHER KEYWORDS: BUOY MOORING SYSTEM ; DEPTH PRESSURE MEASUREMENT ;
 INSTRUMENT DEPLOYMENT

3610038 WAVE METER
 OTHER KEYWORDS: WAVE MEASUREMENT

3628205 OCEANOGRAPHIC SURVEY DEVICE
 OTHER KEYWORDS: BUOY MOORING SYSTEM ; INSTRUMENT DEPLOYMENT ;
 INSTRUMENT RETRIEVAL

3631550 MOORING DEVICES
 OTHER KEYWORDS: BUOY MOORING SYSTEM ; INSTRUMENT DEPLOYMENT

3670572 AIR-SEA INTERFACE TEMPERATURE MEASURING APPARATUS
 OTHER KEYWORDS: BATHYTHERMOGRAPH ; INSTRUMENT DEPLOYMENT

3691573 SELF-POWERED SIGNAL BUOY
 OTHER KEYWORDS: ELECTRICAL GENERATOR ; POWER, WAVE

3701088 DEMAND SONOBUOY
 OTHER KEYWORDS: SEISMIC HYDROPHONE

3705431 MOORING DEVICES
 OTHER KEYWORDS: BUOY MOORING SYSTEM ; INSTRUMENT DEPLOYMENT

3706225 DIRECTIONAL INCLINOMETER
 OTHER KEYWORDS: CURRENT MEASUREMENT

3727248 BUOY WITH ADJUSTMENTS FOR THE REDUCTION OF THE EFFECT
 OF THE SEA FORCES THEREON

3728748 MOORING APPARATUS
 OTHER KEYWORDS: BUOY MOORING SYSTEM

3729755 IMPROVEMENTS RELATING TO RELEASE MECHANISM FOR BUOYS
 OTHER KEYWORDS: BUOY MOORING SYSTEM ; INSTRUMENT DEPLOYMENT

3754439 OCEANOLOGICAL AND METEOROLOGICAL STATION
 OTHER KEYWORDS: BUOY MOORING SYSTEM ; INSTRUMENT DEPLOYMENT

3765236 APPARATUS FOR RECORDING SWELL FREQUENCY AND PROPAGATION DIRECTION
OF WAVES. OTHER KEYWORDS: WAVE MEASUREMENT

3769838 WAVE MEASURING APPARATUS
OTHER KEYWORDS: WAVE MEASUREMENT

3774564 OCEANOGRAPHIC VEHICLE AND PLATFORM
OTHER KEYWORDS: TOWED VEHICLE

CATHODIC PROTECTION

3616418 ANODE ASSEMBLY FOR CATHODIC PROTECTION SYSTEMS
OTHER KEYWORDS: CORROSION PREVENTION ; OFFSHORE PLATFORM, LEG

3616422 GALVANIC ANODE
OTHER KEYWORDS: CORROSION PREVENTION

3635813 ANODE SYSTEM FOR CATHODIC PROTECTION OF STRETCHED CHAIN
OTHER KEYWORDS: CORROSION PREVENTION

3661742 ELECTROLYTIC METHOD OF MARINE FOULING CONTROL
OTHER KEYWORDS: FOULING PREVENTION

3684680 ELECTRODES FOR ELECTROLYTIC OR CATHODIC ANTICORROSION PROTECTION
OTHER KEYWORDS: CORROSION PREVENTION

3689395 CATHODIC PROTECTION SYSTEM AND DELAY-ACTIVATION ANODE
OTHER KEYWORDS: CORROSION PREVENTION

3692650 CATHODIC PROTECTION SYSTEM
OTHER KEYWORDS: CORROSION PREVENTION

3718570 CATHODIC PROTECTION ANODE WITH SECTIONS REPLACEABLE UNDERWATER
OTHER KEYWORDS: CORROSION PREVENTION

3721618 ALUMINUM SACRIFICIAL ANODE
OTHER KEYWORDS: CORROSION PREVENTION

3726779 MARINE ANTICORROSION ANODE STRUCTURE
OTHER KEYWORDS: CORROSION PREVENTION

3766032 METHOD FOR CONTROL OF MARINE FOULING
OTHER KEYWORDS: FOULING PREVENTION

RE27529 GALVANIC ANODE
OTHER KEYWORDS: CORROSION PREVENTION

CHANNEL BARRIER

3632508 METHOD AND APPARATUS FOR DESILTING AND DESALTING BODIES OF WATER
OTHER KEYWORDS: CHANNEL PROTECTION ; TIDAL ESTUARY WATER QUALITY ;
TIDAL INLET

3667234 REDUCING AND RETARDING VOLUME AND VELOCITY OF A LIQUID FREE-FLOWING
IN ONE DIRECTION. OTHER KEYWORDS: TIDAL ESTUARY WATER QUALITY ;
TIDAL INLET

3713298 NAVIGABLE DAM
OTHER KEYWORDS: TIDAL ESTUARY WATER QUALITY ; TIDAL INLET

3720067 METHOD FOR BUILDING IMMERSED STRUCTURES AND A DEVICE FOR
CARRYING OUT SAID METHOD. OTHER KEYWORDS: GROUTING ;
OFFSHORE CONSTRUCTION ; PILE, SHEET ; PILE, STEEL ; SEABED FOUNDATION

3733830 TIDAL FLOW SYSTEM AND METHOD FOR CAUSING WATER
TO FLOW THROUGH WATERWAYS. OTHER KEYWORDS: TIDAL ESTUARY WATER LEVEL ;
TIDAL ESTUARY WATER QUALITY

3756032 SLUICEGATE STRUCTURE
OTHER KEYWORDS: TIDAL ESTUARY WATER LEVEL ; TIDAL INLET

3762168 WATER POLLUTION CONTROL
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SURFACE BARRIER

CHANNEL PROTECTION

3565491 JET PUMP METHOD AND SYSTEM
OTHER KEYWORDS: DREDGE-SPOIL MEASUREMENT ; DREDGE-SPOIL TRANSPORT ;
DREDGE, SUCTION ; PUMP ; TIDAL INLET

3632508 METHOD AND APPARATUS FOR DESILTING AND DECALTING BODIES OF WATER
OTHER KEYWORDS: CHANNEL BARRIER ; TIDAL ESTUARY WATER QUALITY ;
TIDAL INLET

3638432 STATIONARY DREDGING APPARATUS
OTHER KEYWORDS: DREDGE, SUCTION ; TIDAL INLET

COATING

3553970 INFLATABLE CLAMPING DEVICE
OTHER KEYWORDS: CORROSION PREVENTION ; PILE PROTECTION

3565672 METHOD OF IMPROVING RESISTANCE TO CORROSION OF METAL SURFACE
AND RESULTANT ARTICLE
OTHER KEYWORDS: CORROSION PREVENTION

3581505 A METHOD OF ENCASING A PARTIALLY SUBMERGED STRUCTURE
OTHER KEYWORDS: FOULING PREVENTION

3702778 SHIP'S HULL COATED WITH ANTIFOULING SILICONE RUBBER
OTHER KEYWORDS: FOULING PREVENTION

3719049 CORROSION PREVENTING APPARATUS AND METHOD
OTHER KEYWORDS: CORROSION PREVENTION ; PILE PROTECTION

3736759 PILE COVERING
OTHER KEYWORDS: CORROSION PREVENTION ; PILE PROTECTION

3748863 CONNECTION FOR A NONMETALLIC FOUNDATION PILE
OTHER KEYWORDS: CORROSION PREVENTION ; PILE, CONCRETE ;
PILE SECTION CONNECTION

3765923 PROCESS AND COMPOSITION FOR BLAST-CLEANING
AND CORROSION-PROTECTING METAL SURFACES
OTHER KEYWORDS: CORROSION PREVENTION

3765933 METHOD FOR THE PROTECTION AGAINST AQUATIC PARASITES
OTHER KEYWORDS: FOULING PREVENTION

3766879 APPARATUS FOR COATING UNDER WATER
OTHER KEYWORDS: CORROSION PREVENTION ; FOULING PREVENTION ;
STRUCTURE REPAIR

3773550 INHIBITING DEGRADATION AND CORROSION OF SOLID SUBSTRATES
BY APPLICATION THERETO OF A CURABLE COATING OF A POLYEPOXIDE
AND AN OXAZINE OR OXAZOLINE. OTHER KEYWORDS: CORROSION PREVENTION

COFFERDAM

3710579 PORTABLE COFFER DAM AND METHOD OF MAKING

3768265 COFFERDAM
OTHER KEYWORDS: PILE, SHEET ; PILE, STEEL ; STRUCTURE REPAIR

COLLISION PROTECTION

- 3552131 OFFSHORE INSTALLATION
OTHER KEYWORDS: ICE PROTECTION ; OFFSHORE PLATFORM, FIXED ;
OFFSHORE STORAGE TANK, EMERGENT ; OFFSHORE STRUCTURE FENDER
- 3584464 INFLATABLE MARINE FENDER
OTHER KEYWORDS: OFFSHORE STRUCTURE FENDER
- 3593531 MARINE FENDER
OTHER KEYWORDS: OFFSHORE STRUCTURE FENDER
- 3753845 MONOMORING SEA PLATFORM
OTHER KEYWORDS: OFFSHORE MOORING STRUCTURE ; OFFSHORE PLATFORM, FIXED ;
OFFSHORE STRUCTURE FENDER

CONCRETE ARMOR UNIT

- 3562917 APPARATUS FOR MEASURING IRREGULAR SURFACES OF DEPOSITS
OF CONCRETE BLOCKS OR RUBBLE MOUNDS. OTHER KEYWORDS:
BREAKWATER, RUBBLE ; SEABED SITE SURVEY ; STRUCTURE INSPECTION
- 3582034 MOLD FOR CASTING A BREAKWATER CONCRETE BLOCK
OTHER KEYWORDS: CONCRETE FORM
- 3614866 POLYPOD STRUCTURE FOR CIVIL ENGINEERING USES
- 3636713 MARINE BLOCK
- 3759043 MOLDS FOR USE IN MANUFACTURING ENERGY DISSIPATING CONCRETE BLOCKS
FOR RIVER AND MARINE WORKS. OTHER KEYWORDS: CONCRETE FORM

CONCRETE BLOCK

- 3597928 EROSION CONTROL
OTHER KEYWORDS: FABRIC MAT ; LOW-COST SHORE PROTECTION ;
SLOPE PROTECTION ; REVETMENT
- 3602111 PAVING BLOCKS
OTHER KEYWORDS: LOW-COST SHORE PROTECTION ; REVETMENT
- 3613382 SEA WALL CONSTRUCTION
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE, STEEL ; SEAWALL

CONCRETE FORM

- 3570254 METHOD AND MEANS FOR PROTECTING AN EARTH SURFACE AGAINST SCOUR
OTHER KEYWORDS: FABRIC MAT ; LOW-COST SHORE PROTECTION ; REVETMENT ;
SLOPE PROTECTION
- 3582034 MOLD FOR CASTING A BREAKWATER CONCRETE BLOCK
OTHER KEYWORDS: CONCRETE ARMOR UNIT
- 3608320 METHOD AND APPARATUS FOR CONSTRUCTING A CONCRETE WALL STRUCTURE
IN OPEN WATER. OTHER KEYWORDS: OFFSHORE CAISSON ;
OFFSHORE CONSTRUCTION ; PILE DRIVER, WATER JET ; PILE-DRIVING
SHOE ; SEABED FOUNDATION
- 3625014 METHOD AND APPARATUS FOR UNDERWATER DEPOSITION OF SETTABLE MATERIALS
OTHER KEYWORDS: ASPHALT ; SEABED MATERIAL PLACEMENT ;
SLOPE PROTECTION
- 3630036 ELONGATED ELEMENT TO BE DRIVEN INTO THE GROUND TOGETHER WITH A SHOE
OTHER KEYWORDS: PILE, CONCRETE ; PILE DRIVER, WATER JET ;
PILE-DRIVING SHOE

- 3664139 REMOVABLE SELF-JETTING PILE
OTHER KEYWORDS: PILE, CONCRETE ; PILE DRIVER, WATER JET
- 3670504 FABRIC CONTAINMENT CONSTRUCTIONS
OTHER KEYWORDS: BAR PROTECTION ; BREAKWATER, CONCRETE ; FABRIC MAT ;
OFFSHORE CONSTRUCTION
- 3690110 REPAIRING OR REHABILITATING STEEL SUPPORTED H-PILES
OTHER KEYWORDS: PILE, STEEL ; STRUCTURE REPAIR
- 3726950 METHOD FOR PRODUCING SUB-AQUEOUS AND OTHER CAST-IN-PLACE CONCRETE
STRUCTURES IN SITU. OTHER KEYWORDS: BREAKWATER, CONCRETE ; BULKHEAD ;
FABRIC MAT ; OFFSHORE CONSTRUCTION ; PILE, CONCRETE ;
STRUCTURE REPAIR
- 3728864 APPARATUS FOR REPAIRING STEEL SUPPORTING PILES
OTHER KEYWORDS: PILE, STEEL ; STRUCTURE REPAIR
- 3738115 METHOD AND APPARATUS FOR PLASTIC HYDRAULIC MATERIAL
OTHER KEYWORDS: OFFSHORE CAISSON ; OFFSHORE CONSTRUCTION ;
SEABED FOUNDATION ; SEABED MATERIAL PLACEMENT
- 3745775 UNDERWATER IN SITU PLACEMENT OF CONCRETE
OTHER KEYWORDS: SEABED FOUNDATION ; SEABED MATERIAL PLACEMENT
- 3759043 MOLDS FOR USE IN MANUFACTURING ENERGY DISSIPATING CONCRETE BLOCKS
FOR RIVER AND MARINE WORKS
OTHER KEYWORDS: CONCRETE ARMOR UNIT
- 3779027 METHOD AND APPARATUS FOR A CONTINUOUS DUMBBELL TUBE ANCHORING SYSTEM
FOR SUBMARINE PIPELINES. OTHER KEYWORDS: FABRIC MAT ;
SEABED MATERIAL PLACEMENT ; SEABED PIPELINE PLACEMENT ; SEABED SCOUR
PROTECTION
- 3780975 MEANS FOR PRODUCING CAST-IN-PLACE STRUCTURES IN SITU
OTHER KEYWORDS: FABRIC MAT ; OFFSHORE CONSTRUCTION ;
STRUCTURE REPAIR
- RE27460 METHOD FOR ENCASEING RIGID MEMBERS WITH CONCRETE
OTHER KEYWORDS: PILE PROTECTION ; STRUCTURE REPAIR
- CORROSION MEASUREMENT**
- 3599090 APPARATUS FOR DETECTING AND MEASURING CREVICE CORROSION
- 3629090 APPARATUS FOR MEASURING HYDROGEN ABSORPTION
- 3694324 METHOD OF MEASURING ACCELERATED CORROSION RATE
- CORROSION PREVENTION**
- 3553970 INFLATABLE CLAMPING DEVICE
OTHER KEYWORDS: COATING ; PILE PROTECTION
- 3565672 METHOD OF IMPROVING RESISTANCE TO CORROSION OF METAL SURFACE
AND RESULTANT ARTICLE. OTHER KEYWORDS: COATING
- 3616418 ANODE ASSEMBLY FOR CATHODIC PROTECTION SYSTEMS
OTHER KEYWORDS: CATHODIC PROTECTION ; OFFSHORE PLATFORM, LEG
- 3616422 GALVANIC ANODE
OTHER KEYWORDS: CATHODIC PROTECTION
- 3635813 ANODE SYSTEM FOR CATHODIC PROTECTION OF STRETCHED CHAIN
OTHER KEYWORDS: CATHODIC PROTECTION

3677016 CORROSION PROTECTION FOR WELL CASING OF OFFSHORE STRUCTURE
OTHER KEYWORDS: OFFSHORE PLATFORM, FLOATING

3684680 ELECTRODES FOR ELECTROLYTIC OR CATHODIC ANTICORROSION PROTECTION
OTHER KEYWORDS: CATHODIC PROTECTION

3689395 CATHODIC PROTECTION SYSTEM AND DELAY-ACTIVATION ANODE
OTHER KEYWORDS: CATHODIC PROTECTION

3692650 CATHODIC PROTECTION SYSTEM
OTHER KEYWORDS: CATHODIC PROTECTION

3693362 PROTECTION OF UNDERWATER EQUIPMENT BY IMMERSION
OTHER KEYWORDS: OFFSHORE PLATFORM ANCHOR ;
OFFSHORE PLATFORM, FLOATING

3718570 CATHODIC PROTECTION ANODE WITH SECTIONS REPLACEABLE UNDERWATER
OTHER KEYWORDS: CATHODIC PROTECTION

3719049 CORROSION PREVENTING APPARATUS AND METHOD
OTHER KEYWORDS: COATING ; PILE PROTECTION

3721618 ALUMINUM SACRIFICIAL ANODE
OTHER KEYWORDS: CATHODIC PROTECTION

3726779 MARINE ANTICORROSION ANODE STRUCTURE
OTHER KEYWORDS: CATHODIC PROTECTION

3736759 PILE COVERING
OTHER KEYWORDS: COATING ; PILE PROTECTION

3748863 CONNECTION FOR A NONMETALLIC FOUNDATION PILE
OTHER KEYWORDS: COATING ; PILE, CONCRETE ; PILE SECTION CONNECTION

3753354 CORROSION-PROTECTED ANCHORING RODS FOR ANCHORING STRUCTURAL PARTS
IN THE EARTH, AS WELL AS METHOD OF PRODUCING ANCHORINGS WITH
CORROSION-PROTECTED ANCHOR RODS. OTHER KEYWORDS: BULKHEAD ; GROUTING

3765923 PROCESS AND COMPOSITION FOR BLAST-CLEANING
AND CORROSION-PROTECTING METAL SURFACES. OTHER KEYWORDS: COATING

3766879 APPARATUS FOR COATING UNDER WATER
OTHER KEYWORDS: COATING ; FOULING PREVENTION ; STRUCTURE REPAIR

3773550 INHIBITING DEGRADATION AND CORROSION OF SOLID SUBSTRATES
BY APPLICATION THERETO OF A CURABLE COATING OF A POLYEPOXIDE AND AN
OXAZINE OR OXAZOLINE. OTHER KEYWORDS: COATING

RE27529 GALVANIC ANODE
OTHER KEYWORDS: CATHODIC PROTECTION

CURRENT MEASUREMENT

3623362 FREE-FALL CURRENT METER
OTHER KEYWORDS: INSTRUMENT DEPLOYMENT

3693439 ELECTROMAGNETIC WATER CURRENT METER

3693440 ELECTROMAGNETIC FLOWMETER

3695103 CURRENT AND TURBULENCE METER

3706225 DIRECTIONAL INCLINOMETER
OTHER KEYWORDS: BUOY, INSTRUMENTED

3738164 MEASUREMENTS PERTAINING TO OCEAN CURRENTS BY GEOMAGNETIC INDUCTION
OTHER KEYWORDS: DEPTH PRESSURE MEASUREMENT ; INSTRUMENT DEPLOYMENT

3759097 ELECTROMAGNETIC WATER CURRENT METER

DEPTH PRESSURE MEASUREMENT

- 3590635 PYCNOCLINE FOLLOWER APPARATUS
OTHER KEYWORDS: BUOY, INSTRUMENTED ; BUOY MOORING SYSTEM ;
INSTRUMENT DEPLOYMENT
- 3611975 PARAVANE DEVICE
OTHER KEYWORDS: SEISMIC STREAMER CABLE ; TOWED BODY DEPTH CONTROL
- 3738164 MEASUREMENTS PERTAINING TO OCEAN CURRENTS BY GEOMAGNETIC INDUCTION
OTHER KEYWORDS: CURRENT MEASUREMENT ; INSTRUMENT DEPLOYMENT
- 3774570 NON-ROTATING DEPTH CONTROLLER PARAVANE FOR SEISMIC CABLES
OTHER KEYWORDS: SEISMIC STREAMER CABLE ; TOWED BODY DEPTH CONTROL

DREDGE INTAKE

- 3563607 SUBAQUEOUS MINING
OTHER KEYWORDS: DREDGE, SUCTION ; PUMP
- 3579872 DREDGING APPARATUS WITH SURGE COMPENSATING MEANS
OTHER KEYWORDS: DREDGE, CUTTERHEAD ; DREDGE LADDER CONTROL
- 3585738 METHOD AND APPARATUS FOR SUCTION DREDGING
OTHER KEYWORDS: DREDGE, SUCTION
- 3585739 METHOD AND SUCTION DREDGING INSTALLATION FOR OBTAINING SAND
OTHER KEYWORDS: DREDGE, SUCTION
- 3585740 METHOD AND SUCTION DREDGING INSTALLATION
FOR SUCKING UP DREDGING SPOIL. OTHER KEYWORDS: DREDGE, SUCTION
- 3589040 MECHANISM FOR ANTICIPATING THE CONCENTRATION OF SAND
IN A DREDGING SUSPENSION. OTHER KEYWORDS: DREDGE, SUCTION ;
DREDGE-SPOIL MEASUREMENT
- 3603009 SUCTION DREDGE HAVING ENDLESS DICGER ALIGNED WITH SUCTION PIPE
OTHER KEYWORDS: DREDGE, CUTTERHEAD
- 3611595 SUCTION DREDGER AND METHOD OF SUCTION DREDGING
OTHER KEYWORDS: DREDGE, SUCTION
- 3614837 APPARATUS FOR DREDGING AND SIFTING MUD, SANDS OR GRAVEL
OTHER KEYWORDS: DREDGE, CUTTERHEAD
- 3621593 SELF-REGULATING SYSTEM FOR TRANSMISSION OF SOLIDS IN A FLUID MEDIUM
OTHER KEYWORDS: DREDGE, CUTTERHEAD
- 3624933 DREDGING PLANT APPARATUS COMBINING PUMPING AND DIGGING ACTION
OTHER KEYWORDS: DREDGE, SUCTION ; PUMP
- 3645018 METHOD AND APPARATUS FOR EXCLUDING SILT FROM A DREDGING OPERATION
OTHER KEYWORDS: DREDGE, SUCTION ; SEABED PROPERTY MEASUREMENT
- 3657829 DRAGHEAD WITH CONCENTRIC HOLLOW CYLINDERS HAVING ALIGNABLE PORTS
OTHER KEYWORDS: DREDGE, SUCTION ; DREDGE LADDER CONTROL
- 3673716 COMPRESSED AIR OPERATED APPARATUS FOR RAISING UNDERWATER DEPOSITS
OTHER KEYWORDS: DREDGE, CUTTERHEAD ; PUMP
- 3681862 SUCTION DREDGER HAVING PLURAL PUMPS AND PLURAL ARTICULATED
PIPE SECTIONS. OTHER KEYWORDS: DREDGE, SUCTION ;
DREDGE LADDER CONTROL ; PUMP

- 3732701 UNDERWATER PIPELINE TRENCHING APPARATUS
OTHER KEYWORDS: DREDGE, CUTTERHEAD ; SEABED PIPELINE PLACEMENT;
SEABED TRENCHER
- 3738029 DREDGING HEAD WITH PIVOTALLY MOUNTED MUD SHIELD
OTHER KEYWORDS: DREDGE, CUTTERHEAD ; WATER PLANT REMOVAL
- 3740098 MULTI-WHEEL UNDERWATER EXCAVATION MACHINE
OTHER KEYWORDS: DREDGE, CUTTERHEAD
- 3748760 DREDGING MACHINERY WITH SWINGING DOUBLE ENDED SCOOP
OTHER KEYWORDS: DREDGE SUCTION ; DREDGE LADDER CONTROL
- 3756659 SUCTION DREDGING INSTALLATION
OTHER KEYWORDS: DREDGE, SUCTION
- 3760518 ROTARY DREDGE CUTTERHEAD HAVING SPACED GUARD MEMBERS
OTHER KEYWORDS: DREDGE, CUTTERHEAD
- 3774323 COMPOSITE BUCKET-HYDRAULIC DREDGE
OTHER KEYWORDS: DREDGE, SUCTION ; DREDGE LADDER CONTROL ; PUMP ;
SEABED GRADER

DREDGE LADDER CONTROL

- 3579872 DREDGING APPARATUS WITH SURGE COMPENSATING MEANS
OTHER KEYWORDS: DREDGE, CUTTERHEAD ; DREDGE INTAKE
- 3600832 PIVOTED CUTTER AND CONTROL FOR HYDRAULIC DREDGE
OTHER KEYWORDS: DREDGE, CUTTERHEAD
- 3638338 APPARATUS AND METHOD FOR DEEP SEA DREDGING
OTHER KEYWORDS: DREDGE, CUTTERHEAD ; SEABED TRENCHER
- 3657829 DRAGHEAD WITH CONCENTRIC HOLLOW CYLINDERS HAVING ALIGNABLE PORTS
OTHER KEYWORDS: DREDGE, SUCTION ; DREDGE INTAKE
- 3680232 BUCKET LADDER DREDGER
OTHER KEYWORDS: DREDGE, MECHANICAL
- 3681862 SUCTION DREDGER HAVING PLURAL PUMPS AND PLURAL ARTICULATED
PIPE SECTIONS. OTHER KEYWORDS: DREDGE, SUCTION ; DREDGE INTAKE ; PUMP
- 3683521 SUBMERSIBLE DREDGE
OTHER KEYWORDS: DREDGE, CUTTERHEAD ; DREDGE, SUBMERGED ;
DREDGE-SPOIL TRANSPORT
- 3734564 ENDLESS BUCKET DREDGE WITH ARTICULATED LADDER AND SWELL COMPENSATOR
OTHER KEYWORDS: DREDGE, MECHANICAL
- 3739503 HYDRAULIC DREDGE HAVING ARTICULATED LADDER AND SWELL COMPENSATOR
OTHER KEYWORDS: DREDGE, CUTTERHEAD ; DREDGE PROPULSION
- 3748760 DREDGING MACHINERY WITH SWINGING DOUBLE ENDED SCOOP
OTHER KEYWORDS: DREDGE, SUCTION ; DREDGE INTAKE
- 3755932 JACK UP DREDGE
OTHER KEYWORDS: DREDGE, CUTTERHEAD ; DREDGE PROPULSION ;
DREDGE, SUBMERGED ; PUMP
- 3763580 APPARATUS FOR DREDGING IN DEEP OCEAN
OTHER KEYWORDS: DREDGE, CUTTERHEAD ; PUMP
- 3766671 METHOD AND APPARATUS FOR EXCAVATING WITH ENDLESS BUCKET LINE
OTHER KEYWORDS: DREDGE, MECHANICAL

3772805 METHOD AND SUCTION DREDGING INSTALLATION
FOR CONVEYING DREDGING SPOIL. OTHER KEYWORDS: DREDGE, SUCTION ;
DREDGE-SPOIL MEASUREMENT

3774323 COMPOSITE BUCKET-HYDRAULIC DREDGE
OTHER KEYWORDS: DREDGE, SUCTION ; DREDGE INTAKE ; PUMP ;
SEABED GRADER

3777371 CUTTER SUCTION DESIGN HAVING PARALLELOGRAM LINKAGE WAVE COMPENSATOR
OTHER KEYWORDS: DREDGE, CUTTERHEAD

3777375 SUCTION DREDGE WITH BRUSH CUTTING ATTACHMENT
OTHER KEYWORDS: DREDGE, CUTTERHEAD ; WATER PLANT REMOVAL

3777376 ARTICULATED LADDER CONSTRUCTION FOR CUTTERHEAD DREDGE
OTHER KEYWORDS: DREDGE, CUTTERHEAD ; PUMP

DREDGE PIPE

3757369 PIPELINE WITH FLOATS

DREDGE PROPULSION

3591936 SUBMARINE CUTTER DREDGER
OTHER KEYWORDS: DREDGE, CUTTERHEAD ; DREDGE, SUBMERGED

3537331 ANCHORAGE SYSTEM AND METHOD OF USE
OTHER KEYWORDS: EMBEDMENT ANCHOR

3605130 AMPHIBIOUS DITCH EXCAVATOR
OTHER KEYWORDS: DREDGE, CUTTERHEAD ; WATER PLANT REMOVAL

3656449 PROPELLING MEANS FOR A DREDGE
OTHER KEYWORDS: DREDGE, CUTTERHEAD

3706142 SUBMARINE DREDGING APPARATUS
OTHER KEYWORDS: DREDGE, CUTTERHEAD ; DREDGE, SUBMERGED ;
SEABED TRENCHER

3739503 HYDRAULIC DREDGE HAVING ARTICULATED LADDER AND SWELL COMPENSATOR
OTHER KEYWORDS: DREDGE, CUTTERHEAD ; DREDGE LADDER CONTROL

3755932 JACK UP DREDGE
OTHER KEYWORDS: DREDGE, CUTTERHEAD ; DREDGE LADDER CONTROL ;
DREDGE, SUBMERGED ; PUMP

DREDGE-SPOIL MEASUREMENT

3554009 METHOD AND DEVICE FOR DETERMINING THE QUANTITY OF DREDGING SPOIL
TO BE PAID

3554010 METHOD AND SUCTION DREDGING INSTALLATIONS
FOR CONVEYING DREDGING SPOIL

3554011 METHOD AND DEVICE FOR DETERMINING THE CONVEY CONCENTRATION
OF DREDGING SPOIL OF A SUSPENSION OF DREDGING SPOIL AND WATER

3565491 JET PUMP METHOD AND SYSTEM
OTHER KEYWORDS: CHANNEL PROTECTION ; DREDGE-SPOIL TRANSPORT ;
DREDGE, SUCTION ; PUMP ; TIDAL INLET

3589040 MECHANISM FOR ANTICIPATING THE CONCENTRATION OF SAND
IN A DREDGING SUSPENSION. OTHER KEYWORDS: DREDGE, SUCTION ;
DREDGE INTAKE

- 3690180 DREDGER VESSEL AND A METHOD OF DETERMINING THE LOADED WEIGHT
OF SEDIMENTED MATERIAL IN A DREDGER VESSEL
OTHER KEYWORDS: DREDGE-SPOIL TRANSPORT
- 3698573 METHOD AND APPARATUS FOR LOADING A DREDGING VESSEL
WITH DREDGING SPOIL
- 3772805 METHOD AND SUCTION DREDGING INSTALLATION
FOR CONVEYING DREDGING SPOIL. OTHER KEYWORDS: DREDGE, SUCTION ;
DREDGE LADDER CONTROL
- 3775206 METHOD AND DEVICE FOR DETERMINING THE CONVEY CONCENTRATION
OF DREDGING SPOIL OF A SUSPENSION OF DREDGING SPOIL AND WATER
- 3727535 METHOD AND DEVICE FOR DETERMINING THE QUANTITY OF DREDGING SPOIL
TO BE PAID
- 3727536 METHOD AND SUCTION DREDGING INSTALLATIONS
FOR CONVEYING DREDGING SPOIL

DREDGE-SPOIL TRANSPORT

- 3565491 JET PUMP METHOD AND SYSTEM
OTHER KEYWORDS: CHANNEL PROTECTION ; DREDGE-SPOIL MEASUREMENT ;
DREDGE, SUCTION ; PUMP ; TIDAL INLET
- 3628263 PRESSURE DIFFERENTIAL MEASURING MEANS FOR SUCTION DREDGING
INSTRUMENTS. OTHER KEYWORDS: DREDGE, SUCTION
- 3631997 METHOD OF LOADING THE HOLD OF A VESSEL WITH DREDGING SPOIL
- 3650238 SYSTEM OF WATERPROOFING UNITS FOR DREDGING PURPOSES
OTHER KEYWORDS: DREDGE, SUCTION ; HOPPER BARGE
- 3650415 ARRANGEMENT FOR UNLOADING MATERIAL FROM A DREDGE
- 3658386 HOPPER CRAFT
OTHER KEYWORDS: DREDGE, SUCTION ; HOPPER BARGE
- 3669140 SUCTION DREDGING INSTALLATION
OTHER KEYWORDS: DREDGE, SUCTION
- 3683521 SUBMERSIBLE DREDGE
OTHER KEYWORDS: DREDGE, CUTTERHEAD ; DREDGE LADDER CONTROL ;
DREDGE, SUBMERGED
- 3690180 DREDGER VESSEL AND A METHOD OF DETERMINING THE LOADED WEIGHT
OF SEDIMENTED MATERIAL IN A DREDGER VESSEL
OTHER KEYWORDS: DREDGE-SPOIL MEASUREMENT
- 3693272 FLOATING TOWER FOR UNDERWATER DREDGING
OTHER KEYWORDS: DREDGE, SUCTION ; OFFSHORE PLATFORM, FLOATING ; PUMP
- 3750408 PROCESS FOR THE CONTINUOUS DREDGING OF INCOHERENT MATERIAL,
PARTICULARLY SANDY MATERIAL, WITH A CIRCULAR PATH
OTHER KEYWORDS: DREDGE, SUCTION

DREDGE, CUTTERHEAD

- 3572839 PROCESS FOR EXCAVATION OF HARD UNDERWATER BEDS
- 3579872 DREDGING APPARATUS WITH SURGE COMPENSATING MEANS
OTHER KEYWORDS: DREDGE INTAKE ; DREDGE LADDER CONTROL

3591936 SUBMARINE CUTTER DREDGER
 OTHER KEYWORDS: DREDGE PROPULSION ; DREDGE, SUBMERGED

3600832 PIVOTED CUTTER AND CONTROL FOR HYDRAULIC DREDGE
 OTHER KEYWORDS: DREDGE LADDER CONTROL

3603009 SUCTION DREDGE HAVING ENDLESS DIGGER ALIGNED WITH SUCTION PIPE
 OTHER KEYWORDS: DREDGE INTAKE

3605296 AMPHIBIOUS DITCH EXCAVATOR
 OTHER KEYWORDS: DREDGE PROPULSION ; WATER PLANT REMOVAL

3614837 APPARATUS FOR DREDGING AND SIFTING MUD, SANDS OR GRAVEL
 OTHER KEYWORDS: DREDGE INTAKE

3621593 SELF-REGULATING SYSTEM FOR TRANSMISSION OF SOLIDS IN A FLUID MEDIUM
 OTHER KEYWORDS: DREDGE INTAKE

3638338 APPARATUS AND METHOD FOR DEEP SEA DREDGING
 OTHER KEYWORDS: DREDGE LADDER CONTROL ; SEABED TRENCHER

3656449 PROPELLING MEANS FOR A DREDGE
 OTHER KEYWORDS: DREDGE PROPULSION

3673716 COMPRESSED AIR OPERATED APPARATUS FOR RAISING UNDERWATER DEPOSITS
 OTHER KEYWORDS: DREDGE INTAKE ; PUMP

3683521 SUBMERSIBLE DREDGE
 OTHER KEYWORDS: DREDGE LADDER CONTROL ; DREDGE, SUBMERGED ;
 DREDGE-SPOIL TRANSPORT

3706142 SUBMARINE DREDGING APPARATUS
 OTHER KEYWORDS: DREDGE PROPULSION ; DREDGE, SUBMERGED ;
 SEABED TRENCHER

3711968 DREDGE CUTTERHEAD WITH COUNTERBALANCING

3732701 UNDERWATER PIPELINE TRENCHING APPARATUS
 OTHER KEYWORDS: DREDGE INTAKE ; SEABED PIPELINE PLACEMENT ;
 SEABED TRENCHER

3738029 DREDGING HEAD WITH PIVOTALLY MOUNTED MUD SHIELD
 OTHER KEYWORDS: DREDGE INTAKE ; WATER PLANT REMOVAL

3739503 HYDRAULIC DREDGE HAVING ARTICULATED LADDER AND SWELL COMPENSATOR
 OTHER KEYWORDS: DREDGE LADDER CONTROL ; DREDGE PROPULSION

3740098 MULTI-WHEEL UNDERWATER EXCAVATION MACHINE
 OTHER KEYWORDS: DREDGE INTAKE

3751927 APPARATUS FOR ENTRENCHING SUBMERGED ELONGATE STRUCTURES
 OTHER KEYWORDS: SEABED PIPELINE PLACEMENT ; SEABED TRENCHER

3755932 JACK-UP DREDGE
 OTHER KEYWORDS: DREDGE LADDER CONTROL ; DREDGE PROPULSION ;
 DREDGE, SUBMERGED ; PUMP

3760518 ROTARY DREDGE CUTTERHEAD HAVING SPACED GUARD MEMBERS
 OTHER KEYWORDS: DREDGE INTAKE

3763580 APPARATUS FOR DREDGING IN DEEP OCEAN
 OTHER KEYWORDS: DREDGE LADDER CONTROL ; PUMP

3777372 CUTTER SUCTION DREDGE HAVING PARALLELOGRAM LINKAGE WAVE COMPENSATOR
 OTHER KEYWORDS: DREDGE LADDER CONTROL

3777375 SUCTION DREDGE WITH BRUSH CUTTING ATTACHMENT
 OTHER KEYWORDS: DREDGE LADDER CONTROL ; WATER PLANT REMOVAL

3777376 ARTICULATED LADDER CONSTRUCTION FOR CUTTERHEAD DREDGE
OTHER KEYWORDS: DREDGE LADDER CONTROL ; PUMP

DREDGE, MECHANICAL

3679004 DRAG SCRAPER FOR DREDGING SILT

3680232 BUCKET LADDER DREDGER
OTHER KEYWORDS: DREDGE LADDER CONTROL

3693274 CLAM SHELL EXCAVATOR
OTHER KEYWORDS: DREDGE, SUCTION

3734564 ENDLESS BUCKET DREDGE WITH ARTICULATED LADDER AND SWELL COMPENSATOR
OTHER KEYWORDS: DREDGE LADDER CONTROL

3736677 SILT DREDGING METHOD

3762078 BENTHIC DREDGE CONSTRUCTION
OTHER KEYWORDS: SAMPLER, SEABED GRAB

3766671 METHOD AND APPARATUS FOR EXCAVATING WITH ENDLESS BUCKET LINE
OTHER KEYWORDS: DREDGE LADDER CONTROL

3768571 CABLE OPERATED DREDGING SCOOP

3777377 METHOD OF COLLECTING SUBMARINE RESOURCES
OTHER KEYWORDS: SAMPLER, SEABED GRAB

DREDGE, SUBMERGED

3591936 SUBMARINE CUTTER DREDGER
OTHER KEYWORDS: DREDGE, CUTTERHEAD ; DREDGE PROPULSION

3683521 SUBMERSIBLE DREDGE
OTHER KEYWORDS: DREDGE, CUTTERHEAD ; DREDGE LADDER CONTROL ;
DREDGE-SPOIL TRANSPORT

3706142 SUBMARINE DREDGING APPARATUS
OTHER KEYWORDS: DREDGE, CUTTERHEAD ; DREDGE PROPULSION ;
SEABED TRENCHER

3755932 JACK-UP DREDGE
OTHER KEYWORDS: DREDGE, CUTTERHEAD ; DREDGE LADDER CONTROL ;
DREDGE PROPULSION ; PUMP

DREDGE, SUCTION

3563607 SUBAQUEOUS MINING
OTHER KEYWORDS: DREDGE INTAKE ; PUMP

3565491 JET PUMP METHOD AND SYSTEM
OTHER KEYWORDS: CHANNEL PROTECTION ; DREDGE-SPOIL MEASUREMENT ;
DREDGE-SPOIL TRANSPORT ; PUMP ; TIDAL INLET

3585738 METHOD AND APPARATUS FOR SUCTION DREDGING
OTHER KEYWORDS: DREDGE INTAKE

3585739 METHOD AND SUCTION DREDGING INSTALLATION FOR OBTAINING SAND
OTHER KEYWORDS: DREDGE INTAKE

3585740 METHOD AND SUCTION DREDGING INSTALLATION FOR SUCKING
UP DREDGING SPOIL. OTHER KEYWORDS: DREDGE INTAKE

3589040 MECHANISM FOR ANTICIPATING THE CONCENTRATION OF SAND
IN A DREDGING SUSPENSION. OTHER KEYWORDS: DREDGE INTAKE ;
DREDGE-SPOIL MEASUREMENT

3611595 SUCTION DREDGER AND METHOD OF SUCTION DREDGING
OTHER KEYWORDS: DREDGE INTAKE

3624933 DREDGING PLANT APPARATUS COMBINING PUMPING AND DIGGING ACTION
OTHER KEYWORDS: DREDGE INTAKE ; PUMP

3628263 PRESSURE DIFFERENTIAL MEASURING MEANS FOR SUCTION DREDGING
INSTRUMENTS.OTHER KEYWORDS: DREDGE-SPOIL TRANSPORT

3638432 STATIONARY DREDGING APPARATUS
OTHER KEYWORDS: CHANNEL PROTECTION ; TIDAL INLET

3645018 METHOD AND APPARATUS FOR EXCLUDING SILT FROM A DREDGING OPERATION
OTHER KEYWORDS: DREDGE INTAKE ; SEALED PROPERTY MEASUREMENT

3650238 SYSTEM OF WATERBORNE UNITS FOR DREDGING PURPOSES
OTHER KEYWORDS: DREDGE-SPOIL TRANSPORT ; HOPPER BARGE

3651943 POLLUTION SUCTION WATER SWEEPER
OTHER KEYWORDS: POLLUTANT REMOVAL WATERCRAFT ;
POLLUTANT, SUCTION REMOVAL

3657829 DRAGHEAD WITH CONCENTRIC HOLLOW CYLINDERS HAVING ALIGNABLE PORTS
OTHER KEYWORDS: DREDGE INTAKE ; DREDGE LADDER CONTROL

3658386 HOPPER CRAFT
OTHER KEYWORDS: DREDGE-SPOIL TRANSPORT ; HOPPER BARGE

3669140 SUCTION DREDGING INSTALLATION
OTHER KEYWORDS: DREDGE-SPOIL TRANSPORT

3681862 SUCTION DREDGER HAVING PLURAL PUMPS AND PLURAL ARTICULATED
PIPE SECTIONS.OTHER KEYWORDS: DREDGE INTAKE ;
DREDGE LADDER CONTROL ; PUMP

3693272 FLOATING TOWER FOR UNDERWATER DREDGING
OTHER KEYWORDS: DREDGE-SPOIL TRANSPORT ;
OFFSHORE PLATFORM, FLOATING ; PUMP

3693274 CLAM SHELL EXCAVATOR
OTHER KEYWORDS: DREDGE, MECHANICAL

3748760 DREDGING MACHINERY WITH SWINGING DOUBLE ENDED SCOOP
OTHER KEYWORDS: DREDGE INTAKE ; DREDGE LADDER CONTROL

3750408 PROCESS FOR THE CONTINUOUS DREDGING OF INCOHERENT MATERIAL,
PARTICULARLY SANDY MATERIAL, WITH A CIRCULAR PATH
OTHER KEYWORDS: DREDGE-SPOIL TRANSPORT

3756659 SUCTION DREDGING INSTALLATION
OTHER KEYWORDS: DREDGE INTAKE

3772805 METHOD AND SUCTION DREDGING INSTALLATION FOR CONVEYING DREDGING SPOIL
OTHER KEYWORDS: DREDGE LADDER CONTROL ; DREDGE-SPOIL MEASUREMENT

3774323 COMPOSITE BUCKET-HYDRAULIC DREDGE
OTHER KEYWORDS: DREDGE INTAKE ; DREDGE LADDER CONTROL ; PUMP ;
SEABED GRADER

ELECTRICAL GENERATOR

3567953 TIDE-OPERATED POWER PLANT
OTHER KEYWORDS: POWER, TIDE

3569725 WAVE-ACTUATED POWER GENERATOR-BUOY
OTHER KEYWORDS: BUOY, INSTRUMENTED ; INSTRUMENT POWER SUPPLY ;
POWER, WAVE ; PUMP

3603804 WAVE OPERATED POWER APPARATUS
OTHER KEYWORDS: POWER, WAVE ; PUMP

3664125 OFFSHORE POWER CONVERSION APPARATUS
OTHER KEYWORDS: POWER, WAVE

3668412 APPARATUS FOR HARNESSING THE VERTICAL MOVEMENT OF OCEAN TIDES
AND UTILIZE THE FORCE FOR GENERATING ELECTRICAL ENERGY
OTHER KEYWORDS: POWER, TIDE

3685291 POLLUTION FREE ELECTRIC POWER AND WATER PRODUCING STATION
UTILIZING THE KINETIC AND POTENTIAL ENERGY OF WATER WIND WAVES
OTHER KEYWORDS: POWER, WAVE

3691573 SELF-POWERED SIGNAL BUOY
OTHER KEYWORDS: BUOY, INSTRUMENTED ; POWER, WAVE

3697764 METHOD AND APPARATUS FOR GENERATING ELECTRICITY
OTHER KEYWORDS: POWER, WAVE

3746875 ELECTRICAL POWER PLANT DRIVEN BY OCEAN WAVES AND TIDES
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ; POWER, TIDE ; POWER, WAVE

3774048 ENERGY GENERATING AND STORING ASSEMBLY FOR MARINE STRUCTURE
OTHER KEYWORDS: POWER, WAVE

EMBEDMENT ANCHOR

3568622 EXPLOSIVE ANCHOR FIRING DEVICE

3577949 EXPLOSIVELY PROPELLED UNDERWATER EMBEDMENT ANCHOR ASSEMBLY

3597931 ANCHORAGE SYSTEM AND METHOD OF USE
OTHER KEYWORDS: DREDGE PROPULSION

3602320 DEEP SEA PILE SETTING AND CORING VESSEL
OTHER KEYWORDS: SAMPLER, SEABED DRILLED CORE

3604519 METHOD OF CREATING UNDERWATER THRUSTS TO DRIVE A MEMBER
INTO THE EARTH. OTHER KEYWORDS: OFFSHORE CONSTRUCTION ;
PILE DRIVER, IMPACT

3608651 APPARATUS FOR DRIVING ELONGATED ELEMENTS INTO UNDERWATER GROUNDS
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE DRIVER, VIBRATORY ;
PILE PLACEMENT ; SAMPLER, SEABED-DRIVEN CORE

3621805 EMBEDMENT ANCHOR

3628334 FLOATING BREAKWATER
OTHER KEYWORDS: BREAKWATER, FLOATING ; BUOY MOORING SYSTEM

3628337 ANCHORABLE PILE

3648464 METHOD AND MEANS FOR PLACING ARTIFICIAL SEAWEED
OTHER KEYWORDS: ARTIFICIAL SEAWEED ; SEABED MATERIAL PLACEMENT

3653355 MUD ANCHOR

3709182 ANCHOR MEANS AND METHOD OF INSTALLING THE SAME
OTHER KEYWORDS: GROUTING ; OFFSHORE CONSTRUCTION ;
OFFSHORE PLATFORM ANCHOR

- 3731646 EXPLOSIVE EMBEDMENT ANCHOR PROJECTILE
- 3732841 EXPLOSIVELY EMBEDDED ANCHOR
- 3745774 UNDERWATER ANCHOR STRUCTURE AND METHOD OF SETTING SAME
OTHER KEYWORDS: GROUTING ; OFFSHORE PLATFORM ANCHOR
- 3745776 ANCHORING METHOD FOR OFFSHORE MARINE STRUCTURES
OTHER KEYWORDS: GROUTING ; OFFSHORE PLATFORM ANCHOR
- 3750609 POWERFUL THRUSTER METHOD AND APPARATUS SUITABLE
FOR DRIVING A MEMBER SUCH AS AN ANCHOR OR PILE INTO
THE EARTH, AND ANCHORING AND PILE APPARATUS
- 3763656 PLACING OFFSHORE SUPPORTING ELEMENTS
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE DRIVER, WATER JET ;
PILE FOOTING ; SEABED FOUNDATION ; SEABED SOIL TREATMENT
- 3765184 DEVICE AND METHOD FOR THE ATTACHMENT OF PIPELINES
TO AN UNDERWATER SURFACE. OTHER KEYWORDS: SEABED PIPELINE PLACEMENT
- 3777688 METHOD AND APPARATUS FOR EMPLACEMENT OF LONG BEAMS
IN RUGGED SEA BOTTOM AREAS. OTHER KEYWORDS: INSTRUMENT DEPLOYMENT

FABRIC MAT

- 3561219 TEXTILE MAT FOR INDUSTRIAL USE IN THE FIELD OF CIVIL ENGINEERING
OTHER KEYWORDS: SEABED SCOUR PROTECTION ; SLOPE PROTECTION
- 3563037 MINIMIZING SCOURING ACTION IN WATER FLOW CHANNELS
OTHER KEYWORDS: SEABED SCOUR PROTECTION ; SLOPE PROTECTION
- 3564853 METHOD OF CONTROLLING EROSION ON SEASHORES
OTHER KEYWORDS: BAR PROTECTION ; GROIN ; LOW-COST SHORE PROTECTION
- 3570254 METHOD AND MEANS FOR PROTECTING AN EARTH SURFACE AGAINST SCOUR
OTHER KEYWORDS: CONCRETE FORM ; LOW-COST SHORE PROTECTION ;
REVETMENT ; SLOPE PROTECTION
- 3597928 EROSION CONTROL
OTHER KEYWORDS: CONCRETE BLOCK ; LOW-COST SHORE PROTECTION ;
SLOPE PROTECTION ; REVETMENT
- 3670504 FABRIC CONTAINMENT CONSTRUCTIONS
OTHER KEYWORDS: BAR PROTECTION ; BREAKWATER, CONCRETE ;
CONCRETE FORM ; OFFSHORE CONSTRUCTION
- 3696623 WOVEN MAT
OTHER KEYWORDS: SLOPE PROTECTION ; WAVE ABSORBER BEACH
- 3699686 BOTTOM AND BANK FACING MATTRESS
OTHER KEYWORDS: SEABED SCOUR PROTECTION ; SLOPE PROTECTION
- 3716998 MEANS FOR NEUTRALIZING SUBMARINE EROSION
OTHER KEYWORDS: ARTIFICIAL SEAWEEED ; LOW-COST SHORE PROTECTION
- 3726950 METHOD FOR PRODUCING SUB-AQUEOUS AND OTHER CAST-IN-PLACE CONCRETE
STRUCTURES IN SITU. OTHER KEYWORDS: BREAKWATER, CONCRETE ; BULKHEAD ;
CONCRETE FORM ; OFFSHORE CONSTRUCTION ;
PILE, CONCRETE ; STRUCTURE REPAIR
- 3779027 METHOD AND APPARATUS FOR A CONTINUOUS DUMBBELL TUBE ANCHORING SYSTEM
FOR SUBMARINE PIPELINES. OTHER KEYWORDS: CONCRETE FORM ;
SEABED MATERIAL PLACEMENT ; SEABED PIPELINE PLACEMENT ; SEABED
SCOUR PROTECTION

3780975 MEANS FOR PRODUCING CAST-IN-PLACE STRUCTURES IN SITU
OTHER KEYWORDS: CONCRETE FORM ; OFFSHORE CONSTRUCTION ;
STRUCTURE REPAIR

FOULING PREVENTION

3570256 INFLATABLE BERTH
OTHER KEYWORDS: SMALL-CRAFT MOORING DEVICE

3581505 A METHOD OF ENCASEING A PARTIALLY SUBMERGED STRUCTURE
OTHER KEYWORDS: COATING

3661742 ELECTROLYTIC METHOD OF MARINE FOULING CONTROL
OTHER KEYWORDS: CATHODIC PROTECTION

3667873 WATER MOVING APPARATUS FOR DESTRATIFICATION, ICE REDUCTION
AND EAPNACLE CONTROL. OTHER KEYWORDS: ICE PROTECTION

3679466 REPELLING OF MARINE ANIMAL PESTS
OTHER KEYWORDS: WOOD PRESERVATIVE

3702778 SHIP'S HULL COATED WITH ANTIFOULING SILICONE RUBBER
OTHER KEYWORDS: COATING

3731187 TEMPERATURE COMPENSATED FOULING MEASURING METHOD AND APPARATUS

3765933 METHOD FOR THE PROTECTION AGAINST AQUATIC PARASITES
OTHER KEYWORDS: COATING

3766032 METHOD FOR CONTROL OF MARINE FOULING
OTHER KEYWORDS: CATHODIC PROTECTION

3766879 APPARATUS FOR COATING UNDER WATER
OTHER KEYWORDS: COATING ; CORROSION PREVENTION ; STRUCTURE REPAIR

FOULING REMOVAL

3709184 METHOD AND APPARATUS FOR CLEANING VESSELS AFLOAT
OTHER KEYWORDS: SMALL-CRAFT SERVICE STRUCTURE

3773059 JET CLEANING APPARATUS FOR BOATS
OTHER KEYWORDS: SMALL-CRAFT SERVICE STRUCTURE

GROIN

3564853 METHOD OF CONTROLLING EROSION ON SEASHORES
OTHER KEYWORDS: BAR PROTECTION ; FABRIC MAT ;
LOW-COST SHORE PROTECTION

RE27452 FLOATING BOOMS
OTHER KEYWORDS: BREAKWATER, FLOATING ; LOW-COST SHORE PROTECTION ;
POLLUTANT, SURFACE BARRIER

GROUTING

3564856 PROCESS AND APPARATUS FOR CEMENTING OFFSHORE SUPPORT MEMBERS
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, LEG ;
PILE, STRUCTURE CONNECTION ; SEABED FOUNDATION

3601999 METHODS OF GROUTING OFFSHORE STRUCTURES
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE, STRUCTURE CONNECTION

3635033 BITUMINOUS COMPOSITIONS IN HYDRAULIC CONSTRUCTIONS
OTHER KEYWORDS: ASPHALT ; BREAKWATER, RUBBLE ; REVETMENT

3643446 MARINE PLATFORM FOUNDATION MEMBER
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM ANCHOR

- 3653218 HYDRAULIC CONSTRUCTION AND METHOD FOR BUILDING SAME
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ; OFFSHORE PLATFORM, LEG ;
PIER, FIXED ; PILE DOLPHIN ; SEABED FOUNDATION
- 3665717 METHOD AND APPARATUS FOR INSTALLING ELONGATED RODS
IN UNSTABLE EARTH FORMATIONS. OTHER KEYWORDS: BULKHEAD
- 3667239 ANCHOR FOR BUOYANT MARINE STRUCTURES
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM ANCHOR
- 3677018 METHOD FOR DRIVING A FOUNDATION ELEMENT INTO THE EARTH BY MEANS
OF VIBRATION. OTHER KEYWORDS: PILE DRIVER, VIBRATORY ;
PILE-DRIVING SHOE ; PILE FOOTING ; PILE, STEEL
- 3702537 GROUTING SEAL FOR PILING
OTHER KEYWORDS: OFFSHORE PLATFORM, LEG ; PILE, STRUCTURE CONNECTION
- 3704595 CAISSON FOR SEAWORKS CONSTRUCTION AND TO A METHOD
OF USING THE CAISSON. OTHER KEYWORDS: OFFSHORE CAISSON ;
OFFSHORE CONSTRUCTION ; SEABED FOUNDATION ; SEABED MATERIAL
PLACEMENT
- 3706205 APPARATUS AND METHOD OF MAKING AN UNDERWATER CONNECTION
BETWEEN A STRUCTURAL MEMBER AND A SUPPORTING PILE
OTHER KEYWORDS: OFFSHORE CAISSON ; PILE, STRUCTURE CONNECTION ;
SEABED FOUNDATION
- 3709182 ANCHOR MEANS AND METHOD OF INSTALLING THE SAME
OTHER KEYWORDS: EMBEDMENT ANCHOR ; OFFSHORE CONSTRUCTION ;
OFFSHORE PLATFORM ANCHOR
- 3720067 METHOD FOR BUILDING IMMERSED STRUCTURES AND A DEVICE
FOR CARRYING OUT SAID METHOD. OTHER KEYWORDS: CHANNEL BARRIER ;
OFFSHORE CONSTRUCTION ; PILE, SHEET ; PILE, STEEL ; SEABED
FOUNDATION
- 3745774 UNDERWATER ANCHOR STRUCTURE AND METHOD OF SETTING SAME
OTHER KEYWORDS: EMBEDMENT ANCHOR ; OFFSHORE PLATFORM ANCHOR
- 3745776 ANCHORING METHOD FOR OFFSHORE MARINE STRUCTURES
OTHER KEYWORDS: EMBEDMENT ANCHOR ; OFFSHORE PLATFORM ANCHOR
- 3753354 CORROSION-PROTECTED ANCHORING RODS FOR ANCHORING STRUCTURAL PARTS
IN THE EARTH, AS WELL AS METHOD OF PRODUCING ANCHORINGS WITH
CORROSION, PROTECTED ANCHOR RODS. OTHER KEYWORDS:
BULKHEAD ; CORROSION PREVENTION

HOPPER BARGE

- 3581694 LONGITUDINALLY SPLIT BARGES WHICH ARE INTERCONNECTED BY MEANS
OF HINGES
- 3596621 LONGITUDINALLY SPLIT AND HINGED BARGE
- 3602182 TUMBLE BARGE
- 3631827 HOPPER BARGE
- 3648637 HOPPER BARGE DRIVABLE WITH A DRIVING MEANS
- 3650238 SYSTEM OF WATERBORNE UNITS FOR DREDGING PURPOSES
OTHER KEYWORDS: DREDGE, SUCTION ; DREDGE-SPOIL TRANSPORT

3658386 HOPPER CRAFT
OTHER KEYWORDS: DREDGE, SUCTION ; DREDGE-SPOIL TRANSPORT

3688722 HOPPER BARGE

HYDRAULIC MODEL BASIN

3633419 EXPERIMENTAL BASIN AND MEANS FOR TESTING BEHAVIORS
OF OFFSHORE MARINE STRUCTURES. OTHER KEYWORDS: WAVE FLUME

ICE PROTECTION

3552131 OFFSHORE INSTALLATION
OTHER KEYWORDS: COLLISION PROTECTION ; OFFSHORE PLATFORM, FIXED ;
OFFSHORE STORAGE TANK, EMERGENT ; OFFSHORE STRUCTURE FENDER

3563041 OFF-SHORE SHIP MOORING INSTALLATION
OTHER KEYWORDS: OFFSHORE MOORING STRUCTURE

3667873 WATER MOVING APPARATUS FOR DESTRATIFICATION, ICE REDUCTION
AND BARNACLE CONTROL. OTHER KEYWORDS: FOULING PREVENTION

3669052 METHOD AND APPARATUS FOR PREVENTING ICE DAMAGE TO MARINE STRUCTURES
OTHER KEYWORDS: OFFSHORE MOORING STRUCTURE ; OFFSHORE PLATFORM, FIXED ;
OFFSHORE STRUCTURE FENDER

3672175 ICE CUTTER
OTHER KEYWORDS: OFFSHORE MOORING STRUCTURE ;
OFFSHORE STRUCTURE FENDER

3675429 ARCTIC ICE PLATFORM
OTHER KEYWORDS: ICE STRUCTURE ; OFFSHORE CONSTRUCTION ;
OFFSHORE ISLAND ; OFFSHORE PLATFORM, FIXED

3680160 FLOAT FOR SEAMARKS, BUOYS, PONTONS AND THE LIKE
OTHER KEYWORDS: BUOY MOORING SYSTEM ; PIER, PILING ;
SMALL-CRAFT MOORING DEVICE

3693360 ICE BREAKER FOR MARINE STRUCTURES
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ; OFFSHORE PLATFORM, LEG ;
OFFSHORE STRUCTURE FENDER

3696624 BUCKET WHEEL ICE CUTTER
OTHER KEYWORDS: OFFSHORE STRUCTURE FENDER

3742715 PROTECTING A STRUCTURE IN WATER COVERED WITH SHEET ICE
OTHER KEYWORDS: OFFSHORE STRUCTURE FENDER ; ICE STRUCTURE

3745777 CONFIGURATIONS FOR ICE-RESISTANT PLATFORMS
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED

3759046 MOVEMENT OF MARINE STRUCTURES IN SALINE ICE
OTHER KEYWORDS: OFFSHORE MOORING STRUCTURE ; OFFSHORE PLATFORM, LEG ;
OFFSHORE STRUCTURE FENDER ; PILE PROTECTION

ICE STRUCTURE

3675429 ARCTIC ICE PLATFORM
OTHER KEYWORDS: ICE PROTECTION ; OFFSHORE CONSTRUCTION ;
OFFSHORE ISLAND ; OFFSHORE PLATFORM, FIXED

3740956 PORTABLE RETAINING STRUCTURE
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE ISLAND

3742715 PROTECTING A STRUCTURE IN WATER COVERED WITH SHEET ICE
OTHER KEYWORDS: ICE PROTECTION ; OFFSHORE STRUCTURE FENDER

3750412 METHOD OF FORMING AND MAINTAINING OFFSHORE ICE STRUCTURES
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE ISLAND

INSTRUMENT CABLE

3587310 HOLLOW CORE INSTRUMENT CABLE
OTHER KEYWORDS: BATHYTHERMOGRAPH ; INSTRUMENT DEPLOYMENT

3590408 ANCHORING DEVICE FOR A FLOATING BUOY
OTHER KEYWORDS: BUOY MOORING SYSTEM

3634607 ARMORED CABLE

3699237 BUOYANT ELECTRIC CABLE
OTHER KEYWORDS: SEISMIC STREAMER CABLE

3740454 CONTROLLED BUOYANCY ELECTRICAL STRAND

3766307 BUOYANT ELECTRICAL CABLES

INSTRUMENT DEPLOYMENT

3561267 BATHYTHERMOMETER
OTHER KEYWORDS: BATHYTHERMOGRAPH

3561268 EXPENDABLE BATHYTHERMOGRAPH
OTHER KEYWORDS: BATHYTHERMOGRAPH

3570437 MULTI-CYCLE OCEAN DATA GATHERING SYSTEM
OTHER KEYWORDS: BUOY, INSTRUMENTED

3587310 HOLLOW CORE INSTRUMENT CABLE
OTHER KEYWORDS: BATHYTHERMOGRAPH ; INSTRUMENT CABLE

3590635 PYCNOCLINE FOLLOWER APPARATUS
OTHER KEYWORDS: BUOY, INSTRUMENTED ; BUOY MOORING SYSTEM ;
DEPTH PRESSURE MEASUREMENT

3593533 UNDERWATER COLLECTING AND LIFTING DEVICE
OTHER KEYWORDS: SAMPLER, SEABED GRAB

3596512 EXPENDABLE AIR PROBE
OTHER KEYWORDS: BATHYTHERMOGRAPH ; INSTRUMENT, AIRBORNE

3597778 MOORING DEVICES
OTHER KEYWORDS: BUOY MOORING SYSTEM

3604258 UNIFORM DESCENT-RATE PROBE

3604387 MEANS FOR LAUNCHING, TOWING AND RECOVERING AN OCEANOGRAPHIC
TOWED BODY IN A SEAWAY. OTHER KEYWORDS: INSTRUMENT RETRIEVAL ;
TOW WINCH CONTROL

3623362 FREE-FALL CURRENT METER
OTHER KEYWORDS: CURRENT MEASUREMENT

3628205 OCEANOGRAPHIC SURVEY DEVICE
OTHER KEYWORDS: BUOY, INSTRUMENTED ; BUOY MOORING SYSTEM ;
INSTRUMENT RETRIEVAL

3631550 MOORING DEVICES
OTHER KEYWORDS: BUOY, INSTRUMENTED ; BUOY MOORING SYSTEM

3656345 AUTOMATIC FREE-FALL OCEANOGRAPHIC TEMPERATURE PROBE
OTHER KEYWORDS: BATHYTHERMOGRAPH ; INSTRUMENT RETRIEVAL

3670572 AIR-SEA INTERFACE TEMPERATURE MEASURING APPARATUS
OTHER KEYWORDS: BATHYTHERMOGRAPH ; BUOY, INSTRUMENTED

3683699 METHOD OF RETRIEVING MARINE LIFE AND MINERAL SPECIMENS
FROM OCEAN'S DEEPEST PARTS. OTHER KEYWORDS: SAMPLER, BIOTA ;
SAMPLER, SEABED GRAB

3693730 VIBRATORY DEVICE FOR TAKING BOTTOM SEDIMENTS CORES
OTHER KEYWORDS: SAMPLER, SEABED-DRIVEN CORE

3697756 DEVICE FOR INSERTING TAGGED SAND INTO OCEAN FLOOR
OTHER KEYWORDS: INSTRUMENT, RADIOISOTOPE ; SEDIMENTATION MEASUREMENT

3701387 CORE SAMPLING APPARATUS
OTHER KEYWORDS: INSTRUMENT RETRIEVAL ; SAMPLER, POWER SUPPLY ;
SAMPLER, SEABED-DRIVEN CORE

3705431 MOORING DEVICES
OTHER KEYWORDS: BUOY, INSTRUMENTED ; BUOY MOORING SYSTEM

3714996 UNDERSEA CORING MACHINE WITH MEANS FOR SEPARATING SAMPLES
OTHER KEYWORDS: SAMPLER, SEABED-DRIVEN CORE

3728622 METHOD OF AND APPARATUS FOR MEASURING IN SITU THE FORMATION FACTOR
OTHER KEYWORDS: INSTRUMENT, SEABED IN SITU ; INSTRUMENT, TOWED ;
SEABED PROPERTY MEASUREMENT

3729755 IMPROVEMENTS RELATING TO RELEASE MECHANISM FOR BUOYS
OTHER KEYWORDS: BUOY, INSTRUMENTED ; BUOY MOORING SYSTEM

3729855 APPARATUS FOR SEQUENTIALLY DEPLOYING SPECIMEN COLLECTORS
AT SELECTED DEPTHS IN A BODY OF WATER. OTHER KEYWORDS:
INSTRUMENT, TOWED ; SAMPLER, BIOTA

3738164 MEASUREMENTS PERTAINING TO OCEAN CURRENTS BY GEOMAGNETIC INDUCTION
OTHER KEYWORDS: CURRENT MEASUREMENT ; DEPTH PRESSURE MEASUREMENT

3742535 OPEN OCEAN SHALLOW WATER MOOR
OTHER KEYWORDS: BUOY MOORING SYSTEM

3748899 CONDUCTIVITY AND TEMPERATURE SENSING PROBE
OTHER KEYWORDS: BATHYTHERMOGRAPH ; SALINITY MEASUREMENT

3754439 OCEANOLOGICAL AND METEOROLOGICAL STATION
OTHER KEYWORDS: BUOY, INSTRUMENTED ; BUOY MOORING SYSTEM

3777688 METHOD AND APPARATUS FOR EMPLACEMENT OF LONG BEAMS
IN RUGGED SEA BOTTOM AREAS. OTHER KEYWORDS: EMBEDMENT ANCHOR

3761775 ROTATING STEREO SONAR MAPPING AND POSITIONING SYSTEM
OTHER KEYWORDS: SEABED SITE SURVEY ; SONAR, SIDE LOOKING

RE27292 APPARATUS FOR SUBMARINE CORE DRILLING
OTHER KEYWORDS: SAMPLER, POWER SUPPLY ; SAMPLER, SEABED-DRILLED CORE

INSTRUMENT POWER SUPPLY

3769725 WAVE-ACTUATED POWER GENERATOR-BUOY
OTHER KEYWORDS: BUOY, INSTRUMENTED ; ELECTRICAL GENERATOR ;
POWER, WAVE ; PUMP

3613446 SELF-RECORDING ACCELEROMETER
OTHER KEYWORDS: INSTRUMENT, SEABED IN SITU ;
SAMPLER, SEABED-DRIVEN CORE ; SEABED PROPERTY
MEASUREMENT

INSTRUMENT RETRIEVAL

3559607 MULTIPLE RETRIEVAL SYSTEM FOR OBJECTS IN SUBMARINE ENVIRONMENT

3566426 FLOTATION SYSTEM

3604387 MEANS FOR LAUNCHING, TOWING AND RECOVERING AN OCEANOGRAPHIC
TOWED BODY IN A SEAWAY. OTHER KEYWORDS: INSTRUMENT DEPLOYMENT ;
TOW WINCH CONTROL

3628205 OCEANOGRAPHIC SURVEY DEVICE
OTHER KEYWORDS: BUGY, INSTRUMENTED ; BUGY MOORING SYSTEM ;
INSTRUMENT DEPLOYMENT

3656345 AUTOMATIC FREE-FALL OCEANOGRAPHIC TEMPERATURE PROBE
OTHER KEYWORDS: BATHYTHERMOGRAPH ; INSTRUMENT DEPLOYMENT

3701387 CORE SAMPLING APPARATUS
OTHER KEYWORDS: INSTRUMENT DEPLOYMENT ; SAMPLER, POWER SUPPLY ;
SAMPLER, SEABED-DRIVEN CORE

3707196 SEDIMENT SAMPLE RETRIEVE
OTHER KEYWORDS: SAMPLER, SEABED-DRILLED CORE ;
SAMPLER, SEABED-DRIVEN CORE

INSTRUMENT, AIRBORNE

3596512 EXPENDABLE AIR PROBE
OTHER KEYWORDS: BATHYTHERMOGRAPH ; INSTRUMENT DEPLOYMENT

3669540 OPTICAL DEPTH FINDER AND ELEMENTS THEREFOR
OTHER KEYWORDS: INSTRUMENT, LASER ; SONAR, DEPTH SOUNDER

INSTRUMENT, LASER

3669540 OPTICAL DEPTH FINDER AND ELEMENTS THEREFOR
OTHER KEYWORDS: INSTRUMENT, AIRBORNE ; SONAR, DEPTH SOUNDER

3728549 IN SITU DEVICE FOR MEASURING LIGHT SCATTERING
OTHER KEYWORDS: POLLUTANT MEASUREMENT ; SAMPLER, SUSPENDED SEDIMENT

INSTRUMENT, RADIOISOTOPE

3673407 RADIOGRAPHIC APPARATUS FOR UNDERWATER INSPECTION OF WOODEN PILINGS
OTHER KEYWORDS: PILE, WOOD ; STRUCTURE INSPECTION

3697756 DEVICE FOR INSERTING TAGGED SAND INTO OCEAN FLOOR
OTHER KEYWORDS: INSTRUMENT DEPLOYMENT ; SEDIMENTATION MEASUREMENT

3700602 METHOD FOR MASS TAGGING SAND WITH A RADIOACTIVE ISOTOPE
OTHER KEYWORDS: SEDIMENTATION MEASUREMENT

3735129 METHOD FOR LOCATING THE POSITION OF MEMBERS RELATIVE TO EACH OTHER
OTHER KEYWORDS: STRUCTURE INSPECTION

INSTRUMENT, SEABED IN SITU

3613446 SELF-RECORDING ACCELEROMETER
OTHER KEYWORDS: INSTRUMENT POWER SUPPLY ; SAMPLER, SEABED-DRIVEN CORE ;
SEABED PROPERTY MEASUREMENT

3728622 METHOD OF AND APPARATUS FOR MEASURING IN SITU THE FORMATION FACTOR
OTHER KEYWORDS: INSTRUMENT DEPLOYMENT ; INSTRUMENT, TOWED ;
SEABED PROPERTY MEASUREMENT

INSTRUMENT, TOWED

3587309 AERO-HYDRO INTERFACE MEASURING SYSTEM
OTHER KEYWORDS: WAVE MEASUREMENT

3728622 METHOD OF AND APPARATUS FOR MEASURING IN SITU THE FORMATION FACTOR
OTHER KEYWORDS: INSTRUMENT DEPLOYMENT ; INSTRUMENT, SEARED IN SITU ;
SEABED PROPERTY MEASUREMENT

3729855 APPARATUS FOR SEQUENTIALLY DEPLOYING SPECIMEN COLLECTORS
AT SELECTED DEPTHS IN A BODY OF WATER.OTHER KEYWORDS:
INSTRUMENT DEPLOYMENT ; SAMPLER, BIOTA

LOW-COST SHORE PROTECTION

3564853 METHOD OF CONTROLLING EROSION ON SEASHORES
OTHER KEYWORDS: BAR PROTECTION ; FABRIC MAT ; GROIN

3570254 METHOD AND MEANS FOR PROTECTING AN EARTH SURFACE AGAINST SCOUR
OTHER KEYWORDS: CONCRETE FORM ; FABRIC MAT ; REVETMENT ;
SLOPE PROTECTION

3597928 EROSION CONTROL
OTHER KEYWORDS: CONCRETE BLOCK ; FABRIC MAT ; SLOPE PROTECTION ;
REKETMENT

3602111 PAVING BLOCKS
OTHER KEYWORDS: CONCRETE BLOCK ; REVETMENT

3716998 MEANS FOR NEUTRALIZING SUBMARINE EROSION
OTHER KEYWORDS: ARTIFICIAL SEAWEEED ; FABRIC MAT

3727411 INFLUENCING SEDIMENTATION
OTHER KEYWORDS: ARTIFICIAL SEAWEEED

RE27452 FLOATING BOOMS
OTHER KEYWORDS: BREAKWATER, FLOATING ; GROIN ;
POLLUTANT, SURFACE BARRIER

OFFSHORE CAISSON

3556210 DEEP SEA WELL DRILLING STRUCTURE
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; SEABED OIL-PROCESS STRUCTURE

3561220 METHOD AND APPARATUS FOR CONTAINING WELL POLLUTANTS
OTHER KEYWORDS: POLLUTANT, SUBMERGED BARRIER

3608320 METHOD AND APPARATUS FOR CONSTRUCTING A CONCRETE WALL STRUCTURE IN
OPEN WATER.OTHER KEYWORDS: CONCRETE FORM ; OFFSHORE CONSTRUCTION ;
PILE DRIVER, WATER JET ; PILE-DRIVING SHOE ; SEABED FOUNDATION

3618327 CAISSON STRUCTURE AND PIER CONSTRUCTION METHODS
OTHER KEYWORDS: OFFSHORE CONSTRUCTION

3638796 APPARATUS FOR PREVENTING OIL POLLUTION
OTHER KEYWORDS: POLLUTANT, SUBMERGED BARRIER ;
POLLUTANT, SURFACE BARRIER

3640075 METHOD OF INSTALLING BREAKWATER CAISSONS
OTHER KEYWORDS: BREAKWATER, CONCRETE ; OFFSHORE CONSTRUCTION ;
SEAWALL

3686877 SONIC METHOD AND APPARATUS FOR INSTALLING OFF-SHORE CAISSONS
FOR OIL OPERATIONS AND THE LIKE.OTHER KEYWORDS:
OFFSHORE CONSTRUCTION ; PILE DRIVER, VIBRATORY

3704595 CAISSON FOR SEAWORKS CONSTRUCTION AND TO A METHOD
OF USING THE CAISSON.OTHER KEYWORDS: GROUTING ;
OFFSHORE CONSTRUCTION ; SEABED FOUNDATION ; SEABED MATERIAL PLACEMENT

3706205 APPARATUS AND METHOD OF MAKING AN UNDERWATER CONNECTION
BETWEEN A STRUCTURAL MEMBER AND A SUPPORTING PILE
OTHER KEYWORDS: GROUTING ; PILE, STRUCTURE CONNECTION ;
SEABED FOUNDATION

3738115 METHOD AND APPARATUS FOR ELASTIC HYDRAULIC MATERIAL
OTHER KEYWORDS: CONCRETE FORM ; OFFSHORE CONSTRUCTION ;
SEABED FOUNDATION ; SEABED MATERIAL PLACEMENT

3779024 STATIONARY STORAGE AND MOORING PLANT RESTING ON THE BOTTOM
OF THE SEA. OTHER KEYWORDS: BREAKWATER, CONCRETE ; OFFSHORE HARBOR ;
OFFSHORE STORAGE TANK, EMERGENT ; PIER, FIXED ; SEABED FOUNDATION

OFFSHORE CONSTRUCTION

3555831 COMPOSITE FOUNDATION MEMBER AND METHOD
OTHER KEYWORDS: PILE, STRUCTURE CONNECTION ; SEABED FOUNDATION

3556210 DEEP SEA WELL DRILLING STRUCTURE
OTHER KEYWORDS: OFFSHORE CAISSON ; SEABED OIL, PROCESS STRUCTURE

3564650 PROCESS AND APPARATUS FOR CEMENTING OFFSHORE SUPPORT MEMBERS
OTHER KEYWORDS: GROUTING ; OFFSHORE PLATFORM, LEG ;
PILE, STRUCTURE CONNECTION ; SEABED FOUNDATION

3568449 CONSTRUCTION OF LAND MASSES BOUNDED BY WATER
OTHER KEYWORDS: BREAKWATER, RUPPEL ; OFFSHORE ISLAND

3575905 METHOD AND APPARATUS FOR OFFSHORE OPERATIONS
OTHER KEYWORDS: OFFSHORE PLATFORM, JACK UP ; PILE PLACEMENT ;
SEABED FOUNDATION

3577738 APPARATUS FOR INJECTING SAND BENEATH SUBMERGED CONSTRUCTIONS
OTHER KEYWORDS: SEABED MATERIAL PLACEMENT

3585801 OFFSHORE TOWER
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED

3587503 MEANS FOR CONSTRUCTING BUOYANT PLATFORMS
OTHER KEYWORDS: PIER, FLOATING

3593529 METHOD AND APPARATUS FOR INSTALLING DRILLING PLATFORMS
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ; OFFSHORE PLATFORM, JACK UP

3597930 METHOD AND APPARATUS FOR REINFORCING IN SITU IN PILE CASING
OTHER KEYWORDS: OFFSHORE PLATFORM, LEG ; PILE, CONCRETE ; PILE, STEEL ;
STRUCTURE REPAIR

3601999 METHODS OF GROUTING OFFSHORE STRUCTURES
OTHER KEYWORDS: GROUTING ; PILE, STRUCTURE CONNECTION

3602000 REINFORCED STEEL PIPE PILING STRUCTURE
OTHER KEYWORDS: OFFSHORE PLATFORM, LEG ; PILE, CONCRETE ; PILE, STEEL ;
STRUCTURE REPAIR

3604519 METHOD OF CREATING UNDERWATER THRUSTS TO DRIVE A MEMBER
INTO THE EARTH. OTHER KEYWORDS: EMBEDMENT ANCHOR ; PILE DRIVER, IMPACT

3604522 PILE-DRIVING SYSTEM AND APPARATUS
OTHER KEYWORDS: PILE DRIVER, IMPACT ; PILE PLACEMENT

3608320 METHOD AND APPARATUS FOR CONSTRUCTING A CONCRETE WALL STRUCTURE
IN OPEN WATER. OTHER KEYWORDS: CONCRETE FORM ; OFFSHORE CAISSON ;
PILE DRIVER, WATER JET ; PILE-DRIVING SHOE ; SEABED FOUNDATION

- 3608651 APPARATUS FOR DRIVING ELONGATED ELEMENTS INTO UNDERWATER GROUNDS
OTHER KEYWORDS: EMBEDMENT ANCHOR ; PILE DRIVER, VIBRATORY ;
PILE PLACEMENT ; SAMPLER, SEABED-DRIVEN CORE
- 3613382 SEA WALL CONSTRUCTION
OTHER KEYWORDS: CONCRETE BLOCK ; PILE, STEEL ; SEAWALL
- 361-871 METHOD, APPARATUS, AND DOCK MEMBER COMPONENTS FOR ERECTING, ALIGNING,
REALIGNING, OR DISASSEMBLING A DOCK MEMBER. OTHER KEYWORDS: PIER, FIXED ;
PIER, MOBILE ; SMALL-CRAFT PIER
- 3618327 CAISSON STRUCTURE AND PIER CONSTRUCTION METHODS
OTHER KEYWORDS: OFFSHORE CAISSON
- 3621662 UNDERWATER STORAGE STRUCTURE AND METHOD OF INSTALLATION
OTHER KEYWORDS: OFFSHORE STORAGE TANK-SUBMERGED
- 3636718 WATER JETTED PILING
OTHER KEYWORDS: PILE, CONCRETE ; PILE DRIVER, WATER JET ;
PILE-DRIVING SHOE
- 3638738 PILE DRIVING APPARATUS
OTHER KEYWORDS: PILE DRIVER, IMPACT
- 3640075 METHOD OF INSTALLING BREAKWATER CAISSONS
OTHER KEYWORDS: BREAKWATER, CONCRETE ; OFFSHORE CAISSON ; SEAWALL
- 3643446 MARINE PLATFORM FOUNDATION MEMBER
OTHER KEYWORDS: GROUTING ; OFFSHORE PLATFORM ANCHOR
- 3645345 DYNAMIC PILE-DRIVING SHOES
OTHER KEYWORDS: PILE DRIVER, VIBRATORY ; PILE-DRIVING SHOE
- 3648466 ELEVATED RESERVOIR FOR USE WITH OFF-SHORE OIL WELLS
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ;
OFFSHORE STORAGE TANK, EMERGENT ; PILE, STRUCTURE CONNECTION
- 3657896 METHOD OF CONSTRUCTING CONTINUOUS WALL BY USE OF PILES
OR PILE SHEETS AND APPARATUS THEREFOR. OTHER KEYWORDS: BULKHEAD ;
PILE DRIVER, IMPACT ; PILE DRIVER LEADS ; PILE PLACEMENT
- 3667239 ANCHOR FOR BUOYANT MARINE STRUCTURES
OTHER KEYWORDS: GROUTING ; OFFSHORE PLATFORM ANCHOR
- 3670504 FABRIC CONTAINMENT CONSTRUCTIONS
OTHER KEYWORDS: BAR PROTECTION ; BREAKWATER, CONCRETE ;
CONCRETE FORM ; FABRIC MAT
- 3672177 SUBSEA FOUNDATION UNIT AND METHOD OF INSTALLATION
OTHER KEYWORDS: PILE PLACEMENT ; SEABED FOUNDATION ;
SEABED OIL, PROCESS STRUCTURE
- 3675429 ARCTIC ICE PLATFORM
OTHER KEYWORDS: ICE STRUCTURE ; ICE PROTECTION ; OFFSHORE ISLAND ;
OFFSHORE PLATFORM, FIXED
- 3677113 METHOD AND APPARATUS FOR FORMING A FOUNDATION-LEG ASSEMBLY
FOR AN OFFSHORE PLATFORM. OTHER KEYWORDS: OFFSHORE PLATFORM, LEG ;
PILE, CONCRETE ; PILE FOOTING ; PILE, STEEL ; SEABED FOUNDATION
- 3680644 PILE DRIVING SYSTEM AND APPARATUS
OTHER KEYWORDS: PILE DRIVER, IMPACT ; PILE, STEEL
- 3683632 METHOD OF LAYING A FOUNDATION FOR A STRUCTURAL ELEMENT UNDER WATER
OTHER KEYWORDS: SEABED FOUNDATION ; SEABED MATERIAL PLACEMENT

3686811 SPACED MULTI-WALL CONSTRUCTION UNIT
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ;
OFFSHORE STORAGE TANK, SUBMERGED ; SEABED FOUNDATION

3686877 SONIC METHOD AND APPARATUS FOR INSTALLING OFF-SHORE CAISSONS
FOR OIL OPERATIONS AND THE LIKE. OTHER KEYWORDS: OFFSHORE CAISSON ;
PILE DRIVER, VIBRATORY

3686886 PLANT FOR THE MANUFACTURE OF FLOATING CONCRETE STRUCTURES
IN A BODY OF OPEN WATER. OTHER KEYWORDS: OFFSHORE PLATFORM ANCHOR ;
OFFSHORE PLATFORM, FLOATING

3693361 METHOD AND APPARATUS FOR TRANSPORTING AND LAUNCHING
AN OFFSHORE TOWER. OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ;
SEAPED FOUNDATION

3698198 DEEP-WATER DRILLING, PRODUCTION AND STORAGE SYSTEM
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ;
OFFSHORE STORAGE TANK, EMERGENT ; SEABED FOUNDATION

3700046 TWO-STAGE DROP HAMMER FOR DRIVING LARGE DIAMETER PILING
OTHER KEYWORDS: PILE DRIVER, IMPACT

3703207 SUBSEA BUNKER CONSTRUCTION
OTHER KEYWORDS: SEABED FOUNDATION ; SEABED OIL, PROCESS STRUCTURE

3704595 CAISSON FOR SEAWORKS CONSTRUCTION AND TO A METHOD
OF USING THE CAISSON. OTHER KEYWORDS: GROUTING ;
OFFSHORE CAISSON ; SEABED FOUNDATION ; SEABED MATERIAL PLACEMENT

3708985 ARTICULATED MARINE PLATFORM
OTHER KEYWORDS: OFFSHORE PLATFORM ANCHOR ;
OFFSHORE PLATFORM, FLOATING

3708986 IMMERSIBLE RESERVOIR
OTHER KEYWORDS: OFFSHORE STORAGE TANK, SUBMERGED

3709182 ANCHOR MEANS AND METHOD OF INSTALLING THE SAME
OTHER KEYWORDS: EMBEDMENT ANCHOR ; GROUTING ; OFFSHORE PLATFORM ANCHOR

3710582 UNIQUE SUBSEA STORAGE VESSEL AND UNIQUE METHOD OF LOWERING SAME
OTHER KEYWORDS: OFFSHORE STORAGE TANK, SUBMERGED

3716994 ASSEMBLY SYSTEM FOR A DETACHABLY CONNECTED OFFSHORE
MARINE STRUCTURE. OTHER KEYWORDS: OFFSHORE PLATFORM, JACK UP ;
SEABED FOUNDATION

3720066 INSTALLATIONS FOR SUBMARINE WORK
OTHER KEYWORDS: OFFSHORE PLATFORM, FLOATING

3720067 METHOD FOR BUILDING IMMERSED STRUCTURES AND A DEVICE
FOR CARRYING OUT SAID METHOD. OTHER KEYWORDS: CHANNEL BARRIER ;
GROUTING ; PILE, SHEET ; PILE, STEEL ; SEABED FOUNDATION

3724222 MOORING STRUCTURE AND METHOD
OTHER KEYWORDS: OFFSHORE MOORING STRUCTURE ; PILE DOLPHIN ;
PILE, STEEL

3726950 METHOD FOR PRODUCING SUB-AQUEOUS AND OTHER CAST-IN-PLACE CONCRETE
STRUCTURES IN SITU. OTHER KEYWORDS: BREAKWATER, CONCRETE ; BULKHEAD ;
CONCRETE FORM ; FABRIC MAT ; PILE, CONCRETE ; STRUCTURE REPAIR

3729940 OFFSHORE TOWER
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ; SEABED FOUNDATION

- 3736756 METHOD AND APPARATUS FOR ASSEMBLING AN OFFSHORE STRUCTURE
OTHER KEYWORDS: OFFSHORE PLATFORM ANCHOR ; OFFSHORE PLATFORM, FLOATING
- 3738115 METHOD AND APPARATUS FOR PLASTIC HYDRAULIC MATERIAL
OTHER KEYWORDS: CONCRETE FORM ; OFFSHORE CAISSON ;
SEABED FOUNDATION ; SEABED MATERIAL PLACEMENT
- 3740956 PORTABLE RETAINING STRUCTURE
OTHER KEYWORDS: OFFSHORE ISLAND ; ICE STRUCTURE
- 3750412 METHOD OF FORMING AND MAINTAINING OFFSHORE ICE STRUCTURES
OTHER KEYWORDS: OFFSHORE ISLAND ; ICE STRUCTURE
- 3751930 ARTICULATED MARINE STRUCTURE WITH PREPOSITIONED ANCHORING PILES
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ; PILE DRIVER LEADS ;
PILE PLACEMENT ; SEABED FOUNDATION
- 3754403 OFFSHORE MARINE STRUCTURE EMBODYING ANCHOR PILE MEANS
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ; PILE DRIVER LEADS ;
PILE PLACEMENT ; SEABED FOUNDATION
- 3756033 OFFSHORE STRUCTURE WITH ROTATING AND INDEXING MECHANISM
FOR PLACING PILES. OTHER KEYWORDS: OFFSHORE PLATFORM ANCHOR ;
OFFSHORE PLATFORM, FLOATING ; PILE PLACEMENT
- 3763656 PLACING OFFSHORE SUPPORTING ELEMENTS
OTHER KEYWORDS: EMBEDMENT ANCHOR ; PILE DRIVER, WATER JET ;
PILE FOOTING ; SEABED FOUNDATION ; SEABED SOIL TREATMENT
- 3780975 MEANS FOR PRODUCING CAST-IN-PLACE STRUCTURES IN SITU
OTHER KEYWORDS: CONCRETE FORM ; RAFTIC MAT ; STRUCTURE REPAIR
- OFFSHORE HARBOR
- 3680320 OFF-SHORE TRANSPORTATION, INDUSTRIAL AND URBAN COMPLEX
OTHER KEYWORDS: BREAKWATER, RUBBLE ; OFFSHORE ISLAND
- 3779024 STATIONARY STORAGE AND MOORING PLANT RESTING ON THE BOTTOM
OF THE SEA. OTHER KEYWORDS: BREAKWATER, CONCRETE ; OFFSHORE CAISSON ;
OFFSHORE STORAGE TANK, EMERGENT ; PIER, FIXED ; SEABED FOUNDATION
- OFFSHORE ISLAND
- 3568449 CONSTRUCTION OF LAND MASSES BOUNDED BY WATER
OTHER KEYWORDS: BREAKWATER, RUBBLE ; OFFSHORE CONSTRUCTION
- 3675429 ARCTIC ICE PLATFORM
OTHER KEYWORDS: ICE STRUCTURE ; ICE PROTECTION ;
OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED
- 3680320 OFF-SHORE TRANSPORTATION, INDUSTRIAL AND URBAN COMPLEX
OTHER KEYWORDS: BREAKWATER, RUBBLE ; OFFSHORE HARBOR
- 3740956 PORTABLE RETAINING STRUCTURE
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; ICE STRUCTURE
- 3750412 METHOD OF FORMING AND MAINTAINING OFFSHORE ICE STRUCTURES
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; ICE STRUCTURE
- OFFSHORE MOORING STRUCTURE
- 3563041 OFF-SHORE SHIP MOORING INSTALLATION
OTHER KEYWORDS: ICE PROTECTION
- 3564858 BOAT LANDING FOR OFFSHORE STRUCTURE
OTHER KEYWORDS: OFFSHORE STRUCTURE FENDER

3595196 FLOATING PLATFORM FOR VESSEL MOORING
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED

3668875 OFFSHORE TERMINAL
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ; OFFSHORE PLATFORM, LEG

3669052 METHOD AND APPARATUS FOR PREVENTING ICE DAMAGE TO MARINE STRUCTURES
OTHER KEYWORDS: ICE PROTECTION ; OFFSHORE PLATFORM, FIXED ;
OFFSHORE STRUCTURE FENDER

3672175 ICE CUTTER
OTHER KEYWORDS: ICE PROTECTION ; OFFSHORE STRUCTURE FENDER

3675610 MOORING STRUCTURE IN COMBINATION WITH A FENDER
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ; OFFSHORE STRUCTURE FENDER

3690108 STABLE OFFSHORE STRUCTURES
OTHER KEYWORDS: OFFSHORE PLATFORM, FLOATING ;
OFFSHORE STORAGE TANK, EMERGENT

3712068 OFFSHORE INSTALLATION FOR PRODUCING, STORING AND LOADING OIL
FROM UNDERWATER OIL WELL. OTHER KEYWORDS: BREAKWATER, FLOATING ;
OFFSHORE PLATFORM ANCHOR ; OFFSHORE PLATFORM, FLOATING ;
OFFSHORE STORAGE TANK, SUBMERGED

3713415 SHIP MOORING ARRANGEMENT AND A SUBMERGED OIL STORAGE TANK
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ;
OFFSHORE STORAGE TANK, SUBMERGED ; OFFSHORE STRUCTURE FENDER

3724222 MOORING STRUCTURE AND METHOD
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE DOLPHIN ; PILE, STEEL

3759045 MONOMOORING SEA PLATFORM
OTHER KEYWORDS: COLLISION PROTECTION ; OFFSHORE PLATFORM, FIXED ;
OFFSHORE STRUCTURE FENDER

3759046 MOVEMENT OF MARINE STRUCTURES IN SALINE ICE
OTHER KEYWORDS: ICE PROTECTION ; OFFSHORE PLATFORM, LEG ;
OFFSHORE STRUCTURE FENDER ; PILE PROTECTION

OFFSHORE PLATFORM ANCHOR

3553969 SUBMERGED OIL STORAGE STRUCTURE
OTHER KEYWORDS: OFFSHORE PLATFORM, FLOATING ;
OFFSHORE STORAGE TANK, SUBMERGED

3559410 SYSTEM FOR RELIEVING STRESS AT THE TOP AND BOTTOM
OF VERTICAL TUBULAR MEMBERS IN VERTICALLY MOORED PLATFORMS
OTHER KEYWORDS: OFFSHORE PLATFORM, FLOATING

3572043 UNDERWATER STRUCTURE
OTHER KEYWORDS: OFFSHORE PLATFORM, FLOATING

3611734 FOUNDATION ANCHOR FOR FLOATING MARINE PLATFORM
OTHER KEYWORDS: OFFSHORE PLATFORM, FLOATING

3630161 MULTIPLE PURPOSE FLOATING CONCRETE RING
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ;
OFFSHORE STORAGE TANK, EMERGENT ; OFFSHORE STRUCTURE
FENDER ; SEABED FOUNDATION

3643446 MARINE PLATFORM FOUNDATION MEMBER
OTHER KEYWORDS: GROUTING ; OFFSHORE CONSTRUCTION

3648514 MEANS FOR MEASURING FORCES, NOTABLY AT THE FOOT OF AN OSCILLATING COLUMN OR AN OFFSHORE DRILLING PLATFORM. OTHER KEYWORDS: OFFSHORE PLATFORM, FLOATING ; PILE LOAD MEASUREMENT

3667239 ANCHOR FOR BUOYANT MARINE STRUCTURES
OTHER KEYWORDS: GROUTING ; OFFSHORE CONSTRUCTION

3686886 PLANT FOR THE MANUFACTURE OF FLOATING CONCRETE STRUCTURES IN A BODY OF OPEN WATER. OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FLOATING

3690790 TIDE-POWERED UNIT AND FLOATING PLATFORM UTILIZING SAME
OTHER KEYWORDS: OFFSHORE PLATFORM, FLOATING ; POWER, TIDE ; PUMP

3693362 PROTECTION OF UNDERWATER EQUIPMENT BY IMMERSION
OTHER KEYWORDS: CORROSION PREVENTION ; OFFSHORE PLATFORM, FLOATING

3708985 ARTICULATED MARINE PLATFORM
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM-FLOATING

3709182 ANCHOR MEANS AND METHOD OF INSTALLING THE SAME
OTHER KEYWORDS: EMBEDMENT ANCHOR ; GROUTING ; OFFSHORE CONSTRUCTION

3710580 MARINE PLATFORM FOUNDATION STRUCTURE
OTHER KEYWORDS: OFFSHORE PLATFORM, FLOATING ; OFFSHORE PLATFORM, LEG

3712068 OFFSHORE INSTALLATION FOR PRODUCING, STORING AND LOADING OIL FROM UNDERWATER OIL WELL. OTHER KEYWORDS: BREAKWATER, FLOATING ; OFFSHORE MOORING STRUCTURE ; OFFSHORE PLATFORM, FLOATING ; OFFSHORE STORAGE TANK, SUBMERGED

3714788 PLATFORM BUOYANT UNDERSTRUCTURE
OTHER KEYWORDS: OFFSHORE PLATFORM, FLOATING ; OFFSHORE PLATFORM, LEG

3736756 METHOD AND APPARATUS FOR ASSEMBLING AN OFFSHORE STRUCTURE
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FLOATING

3745774 UNDERWATER ANCHOR STRUCTURE AND METHOD OF SETTING SAME
OTHER KEYWORDS: EMBEDMENT ANCHOR ; GROUTING

3745776 ANCHORING METHOD FOR OFFSHORE MARINE STRUCTURES
OTHER KEYWORDS: EMBEDMENT ANCHOR ; GROUTING

3756033 OFFSHORE STRUCTURE WITH ROTATING AND INDEXING MECHANISM FOR PLACING PILES. OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FLOATING ; PILE PLACEMENT

3768268 DRILLING OR PRODUCTION PLATFORM FOR WORK AT SEA
OTHER KEYWORDS: OFFSHORE PLATFORM, FLOATING

OFFSHORE PLATFORM, FIXED

3552131 OFFSHORE INSTALLATION
OTHER KEYWORDS: COLLISION PROTECTION ; ICE PROTECTION ; OFFSHORE STORAGE TANK, EMERGENT ; OFFSHORE STRUCTURE FENDER

3585801 OFFSHORE TOWER
OTHER KEYWORDS: OFFSHORE CONSTRUCTION

3592012 Laterally Reinforced Offshore Platform
OTHER KEYWORDS: PILE PLACEMENT ; SEABED FOUNDATION

3593529 METHOD AND APPARATUS FOR INSTALLING DRILLING PLATFORMS
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, JACK UP

3595196 FLOATING PLATFORM FOR VESSEL MOORING
OTHER KEYWORDS: OFFSHORE MOORING STRUCTURE

3630161 MULTIPLE PURPOSE FLOATING CONCRETE RING
OTHER KEYWORDS: OFFSHORE PLATFORM ANCHOR ;
OFFSHORE STORAGE TANK, EMERGENT ; OFFSHORE STRUCTURE
FENDER ; SEABED FOUNDATION

3638436 REVERSED SLOPE SKIRT PILE MARINE PLATFORM ANCHORING
OTHER KEYWORDS: PILE PLACEMENT ; SEABED FOUNDATION

3645104 TOWER STRUCTURE
OTHER KEYWORDS: OFFSHORE STORAGE TANK, EMERGENT ; SEABED FOUNDATION

3648466 ELEVATED RESERVOIR FOR USE WITH OFF-SHORE OIL WELLS
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ;
OFFSHORE STORAGE TANK, EMERGENT ; PILE, STRUCTURE CONNECTION

3653218 HYDRAULIC CONSTRUCTION AND METHOD FOR BUILDING SAME
OTHER KEYWORDS: GROUTING ; OFFSHORE PLATFORM, LEG ; PIER, FIXED ;
PILE DOLPHIN ; SEABED FOUNDATION

3657895 OFFSHORE PLATFORM
OTHER KEYWORDS: OFFSHORE STORAGE TANK, EMERGENT ;
POLLUTANT COLLECTION ; POLLUTANT, SUBMERGED BARRIER

3665721 SUBMERGED WELL PLATFORM
OTHER KEYWORDS: OFFSHORE STORAGE TANK, SUBMERGED

3668875 OFFSHORE TERMINAL
OTHER KEYWORDS: OFFSHORE MOORING STRUCTURE ; OFFSHORE PLATFORM, LEG

3668876 OFFSHORE TOWER APPARATUS AND METHOD
OTHER KEYWORDS: SEABED FOUNDATION

3669052 METHOD AND APPARATUS FOR PREVENTING ICE DAMAGE TO MARINE STRUCTURES
OTHER KEYWORDS: ICE PROTECTION ; OFFSHORE MOORING STRUCTURE ;
OFFSHORE STRUCTURE FENDER

3675429 ARCTIC ICE PLATFORM
OTHER KEYWORDS: ICE STRUCTURE ; ICE PROTECTION ;
OFFSHORE CONSTRUCTION ; OFFSHORE ISLAND

3675610 MOORING STRUCTURE IN COMBINATION WITH A FENDER
OTHER KEYWORDS: OFFSHORE MOORING STRUCTURE ;
OFFSHORE STRUCTURE FENDER

3686811 SPACED MULTI-WALL CONSTRUCTION UNIT
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ;
OFFSHORE STORAGE TANK, SUBMERGED ; SEABED FOUNDATION

3693360 ICE BREAKER FOR MARINE STRUCTURES
OTHER KEYWORDS: ICE PROTECTION ; OFFSHORE PLATFORM, LEG ;
OFFSHORE STRUCTURE FENDER

3693361 METHOD AND APPARATUS FOR TRANSPORTING AND LAUNCHING
AN OFFSHORE TOWER. OTHER KEYWORDS: OFFSHORE CONSTRUCTION ;
SEABED FOUNDATION

3698198 DEEP-WATER DRILLING, PRODUCTION AND STORAGE SYSTEM
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ;
OFFSHORE STORAGE TANK, EMERGENT ; SEABED FOUNDATION

3708987 CONCRETE RESERVOIR FOR UNDERWATER USE
OTHER KEYWORDS: OFFSHORE STORAGE TANK, SUBMERGED ; SEABED FOUNDATION

- 3713415 SHIP MOORING ARRANGEMENT AND A SUBMERGED OIL STORAGE TANK
OTHER KEYWORDS: OFFSHORE MOORING STRUCTURE ;
OFFSHORE STORAGE TANK, SUBMERGED ; OFFSHORE STRUCTURE FENDER
- 3716993 MODULAR OFFSHORE STRUCTURES SYSTEM
OTHER KEYWORDS: OFFSHORE PLATFORM, JACK UP ; OFFSHORE PLATFORM, LEG ;
SEABED FOUNDATION
- 3729940 OFFSHORE TOWER
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; SEABED FOUNDATION
- 3745773 SAFETY OFF-SHORE DRILLING AND PUMPING PLATFORM
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SUBMERGED BARRIER ;
POLLUTANT, SUCTION REMOVAL
- 3745777 CONFIGURATIONS FOR ICE-RESISTANT PLATFORMS
OTHER KEYWORDS: ICE PROTECTION
- 3746875 ELECTRICAL POWER PLANT DRIVEN BY OCEAN WAVES AND TIDES
OTHER KEYWORDS: ELECTRICAL GENERATOR ; POWER, TIDE ; POWER, WAVE
- 3751930 ARTICULATED MARINE STRUCTURE WITH PREPOSITIONED ANCHORING PILES
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE DRIVER LEADS ;
PILE PLACEMENT ; SEABED FOUNDATION
- 3754403 OFFSHORE MARINE STRUCTURE EMBEDDING ANCHOR PILE MEANS
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE DRIVER LEADS ;
PILE PLACEMENT ; SEABED FOUNDATION
- 3759045 MONOMOORING SEA PLATFORM
OTHER KEYWORDS: COLLISION PROTECTION ; OFFSHORE MOORING STRUCTURE ;
OFFSHORE STRUCTURE FENDER

OFFSHORE PLATFORM, FLOATING

- 3553969 SUBMERGED OIL STORAGE STRUCTURE
OTHER KEYWORDS: OFFSHORE PLATFORM ANCHOR ;
OFFSHORE STORAGE TANK, SUBMERGED
- 3559410 SYSTEM FOR RELIEVING STRESS AT THE TOP AND BOTTOM
OF VERTICAL TUBULAR MEMBERS IN VERTICALLY MOORED
PLATFORMS. OTHER KEYWORDS: OFFSHORE PLATFORM ANCHOR
- 3568454 APPARATUS FOR WORKING UNDER WATER
OTHER KEYWORDS: SEABED GRADER
- 3572043 UNDERWATER STRUCTURE
OTHER KEYWORDS: OFFSHORE PLATFORM ANCHOR
- 3611734 FOUNDATION ANCHOR FOR FLOATING MARINE PLATFORM
OTHER KEYWORDS: OFFSHORE PLATFORM ANCHOR
- 3648514 MEANS FOR MEASURING FORCES, NOTABLY AT THE FOOT
OF AN OSCILLATING COLUMN OR AN OFFSHORE DRILLING
PLATFORM. OTHER KEYWORDS: OFFSHORE PLATFORM ANCHOR ;
PILE LOAD MEASUREMENT
- 3677016 CORROSION PROTECTION FOR WELL CASING OF OFFSHORE STRUCTURE
OTHER KEYWORDS: CORROSION PREVENTION
- 3686886 PLANT FOR THE MANUFACTURE OF FLOATING CONCRETE STRUCTURES
IN A BODY OF OPEN WATER. OTHER KEYWORDS: OFFSHORE CONSTRUCTION ;
OFFSHORE PLATFORM ANCHOR

3690108 STABLE OFFSHORE STRUCTURES
OTHER KEYWORDS: OFFSHORE MOORING STRUCTURE ;
OFFSHORE STORAGE TANK, EMERGENT

3690790 TIDE-POWERED UNIT AND FLOATING PLATFORM UTILIZING SAME
OTHER KEYWORDS: OFFSHORE PLATFORM ANCHOR ; POWER, TIDE ; PUMP

3693272 FLOATING TOWER FOR UNDERWATER DREDGING
OTHER KEYWORDS: DREDGE, SUCTION ; DREDGE-SPOIL TRANSPORT ; PUMP

3693362 PROTECTION OF UNDERWATER EQUIPMENT BY IMMERSION
OTHER KEYWORDS: CORROSION PREVENTION ; OFFSHORE PLATFORM ANCHOR

3708985 ARTICULATED MARINE PLATFORM
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM ANCHOR

3710580 MARINE PLATFORM FOUNDATION STRUCTURE
OTHER KEYWORDS: OFFSHORE PLATFORM ANCHOR ; OFFSHORE PLATFORM, LEG

3712068 OFFSHORE INSTALLATION FOR PRODUCING, STORING AND LOADING OIL
FROM UNDERWATER OIL WELL. OTHER KEYWORDS: BREAKWATER, FLOATING ;
OFFSHORE MOORING STRUCTURE ; OFFSHORE PLATFORM ANCHOR ;
OFFSHORE STORAGE TANK, SUBMERGED

3714788 PLATFORM BUCYANT UNDERSTRUCTURE
OTHER KEYWORDS: OFFSHORE PLATFORM ANCHOR ; OFFSHORE PLATFORM, LEG

3720066 INSTALLATIONS FOR SUBMARINE WORK
OTHER KEYWORDS: OFFSHORE CONSTRUCTION

3736756 METHOD AND APPARATUS FOR ASSEMBLING AN OFFSHORE STRUCTURE
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM ANCHOR

3756033 OFFSHORE STRUCTURE WITH ROTATING AND INDEXING MECHANISM
FOR PLACING PILES. OTHER KEYWORDS: OFFSHORE CONSTRUCTION ;
OFFSHORE PLATFORM ANCHOR ; PILE PLACEMENT

3768268 DRILLING OR PRODUCTION PLATFORM FOR WORK AT SEA
OTHER KEYWORDS: OFFSHORE PLATFORM ANCHOR

OFFSHORE PLATFORM, JACK UP

3572044 MULTIUNIT OFFSHORE PLATFORM
OTHER KEYWORDS: SEABED OIL, PROCESS STRUCTURE

3575005 METHOD AND APPARATUS FOR OFFSHORE OPERATIONS
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE PLACEMENT ;
SEABED FOUNDATION

3590587 FLOATING PLATFORM WITH HORIZONTALLY MOVABLE COLUMNS
OTHER KEYWORDS: OFFSHORE PLATFORM, WALKING

3592013 TILTING JACK OFFSHORE PLATFORM
OTHER KEYWORDS: SEABED FOUNDATION

3593529 METHOD AND APPARATUS FOR INSTALLING DRILLING PLATFORMS
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED

3593530 MARINE PLATFORM WITH REMOVAL COLUMN CLAMPS
OTHER KEYWORDS: PILE, STRUCTURE CONNECTION ; SEABED FOUNDATION

3680321 MOBILE OFFSHORE PLATFORM
OTHER KEYWORDS: OFFSHORE PLATFORM, WALKING

3699688 APPARATUS AND METHOD FOR REMOVING AND/OR ADDING COLUMN SECTIONS
TO A COLUMN OF A MARINE STRUCTURE. OTHER KEYWORDS:
OFFSHORE PLATFORM, LEG

3716993 MODULAR OFFSHORE STRUCTURES SYSTEM
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ; OFFSHORE PLATFORM, LEG ;
SEABED FOUNDATION

3716994 ASSEMBLY SYSTEM FOR A DETACHABLY CONNECTED OFFSHORE MARINE STRUCTURE
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; SEABED FOUNDATION

3717001 OFFSHORE STORAGE STRUCTURE
OTHER KEYWORDS: OFFSHORE STORAGE TANK, EMERGENT

3727414 OFF SHORE DRILLING PLATFORM CONSTRUCTION

3769802 WALKING JIFT BARGE
OTHER KEYWORDS: OFFSHORE PLATFORM, WALKING

OFFSHORE PLATFORM, LEG

3564856 PROCESS AND APPARATUS FOR CEMENTING OFFSHORE SUPPORT MEMBERS
OTHER KEYWORDS: GROUTING ; OFFSHORE CONSTRUCTION ;
PILE, STRUCTURE CONNECTION ; SEABED FOUNDATION

3597930 METHOD AND APPARATUS FOR REINFORCING IN SITU IN PILE CASING
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE, CONCRETE ; PILE STEEL ;
STRUCTURE REPAIR

3602000 REINFORCED STEEL PIPE PILING STRUCTURE
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE, CONCRETE ; PILE, STEEL ;
STRUCTURE REPAIR

3616418 ANODE ASSEMBLY FOR CATHODIC PROTECTION SYSTEMS
OTHER KEYWORDS: CATHODIC PROTECTION ; CORROSION PREVENTION

3653218 HYDRAULIC CONSTRUCTION AND METHOD FOR BUILDING SAME
OTHER KEYWORDS: GROUTING ; OFFSHORE PLATFORM, FIXED ; PIER, FIXED ;
PILE DOLPHIN ; SEABED FOUNDATION

3668875 OFFSHORE TERMINAL
OTHER KEYWORDS: OFFSHORE MOORING STRUCTURE ; OFFSHORE PLATFORM, FIXED

3677113 METHOD AND APPARATUS FOR FORMING A FOUNDATION-LEG ASSEMBLY
FOR AN OFFSHORE PLATFORM. OTHER KEYWORDS: OFFSHORE CONSTRUCTION ;
PILE, CONCRETE ; PILE FOOTING ; PILE, STEEL ; SEABED FOUNDATION

3686887 SCOUR CONTROL SYSTEM FOR SUBMERGED STRUCTURES
OTHER KEYWORDS: PUMP ; SEABED SCOUR PROTECTION

3693360 ICE BREAKER FOR MARINE STRUCTURES
OTHER KEYWORDS: ICE PROTECTION ; OFFSHORE PLATFORM, FIXED ;
OFFSHORE STRUCTURE FENDER

3693363 EQUIPMENT FOR MOVING STEP BY STEP A STRUCTURE CARRYING OUT
OPERATIONS SUPPORTED ON A SEA-BED OR THE LIKE. OTHER KEYWORDS:
OFFSHORE PLATFORM, WALKING ; SEABED FOUNDATION

3699688 APPARATUS AND METHOD FOR REMOVING AND/OR ADDING COLUMN SECTIONS
TO A COLUMN OF A MARINE STRUCTURE. OTHER KEYWORDS:
OFFSHORE PLATFORM, JACK-UP

3702537 GROUTING SEAL FOR PILING
OTHER KEYWORDS: GROUTING ; PILE, STRUCTURE CONNECTION

3710580 MARINE PLATFORM FOUNDATION STRUCTURE
OTHER KEYWORDS: OFFSHORE PLATFORM ANCHOR ;
OFFSHORE PLATFORM, FLOATING

- 3714788 PLATFORM BUOYANT UNDERSTRUCTURE
OTHER KEYWORDS: OFFSHORE PLATFORM ANCHOR ;
OFFSHORE PLATFORM, FLOATING
- 3716993 MODULAR OFFSHORE STRUCTURES SYSTEM
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ;
OFFSHORE PLATFORM, JACK UP ; SEABED FOUNDATION
- 3759046 MOVEMENT OF MARINE STRUCTURES IN SALINE ICE
OTHER KEYWORDS: ICE PROTECTION ; OFFSHORE MOORING STRUCTURE ;
OFFSHORE STRUCTURE FENDER ; PILE PROTECTION

OFFSHORE PLATFORM, WALKING

- 3590587 FLOATING PLATFORM WITH HORIZONTALLY MOVABLE COLUMNS
OTHER KEYWORDS: OFFSHORE PLATFORM, JACK UP
- 3680321 MOBILE OFFSHORE PLATFORM
OTHER KEYWORDS: OFFSHORE PLATFORM, JACK UP
- 3693363 EQUIPMENT FOR MOVING STEP BY STEP A STRUCTURE CARRYING OUT
OPERATIONS SUPPORTED ON A SEA-BED OR THE LIKE
OTHER KEYWORDS: OFFSHORE PLATFORM, LEG ; SEABED FOUNDATION
- 3769802 WALKING LIFT BARGE
OTHER KEYWORDS: OFFSHORE PLATFORM, JACK UP

OFFSHORE STORAGE TANK, EMERGENT

- 3552131 OFFSHORE INSTALLATION
OTHER KEYWORDS: COLLISION PROTECTION ; ICE PROTECTION ;
OFFSHORE PLATFORM, FIXED ; OFFSHORE STRUCTURE FENDER
- 3599590 FLOATING OIL-RECOVERY SUMP
OTHER KEYWORDS: POLLUTANT, SUBMERGED BARRIER ;
POLLUTANT, SURFACE BARRIER
- 3605774 MARITIME APPARATUS UTILIZABLE AS A HYDROCARBON RESERVOIR
- 3630161 MULTIPLE PURPOSE FLOATING CONCRETE RING
OTHER KEYWORDS: OFFSHORE PLATFORM ANCHOR ; OFFSHORE PLATFORM, FIXED ;
OFFSHORE STRUCTURE FENDER ; SEABED FOUNDATION
- 3645104 TOWER STRUCTURE
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ; SEABED FOUNDATION
- 3648466 ELEVATED RESERVOIR FOR USE WITH OFF-SHORE OIL WELLS
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED ;
PILE-STRUCTURE CONNECTION
- 3657895 OFFSHORE PLATFORM
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ; POLLUTANT COLLECTION ;
POLLUTANT, SUBMERGED BARRIER
- 3675431 OFF-SHORE STORAGE TANKS
- 3690108 STABLE OFFSHORE STRUCTURES
OTHER KEYWORDS: OFFSHORE MOORING STRUCTURE ;
OFFSHORE PLATFORM, FLOATING
- 3698198 DEEP-WATER DRILLING, PRODUCTION AND STORAGE SYSTEM
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED ;
SEABED FOUNDATION
- 3717001 OFFSHORE STORAGE STRUCTURE
OTHER KEYWORDS: OFFSHORE PLATFORM, JACK UP

- 3738113 OFFSHORE OIL STORAGE STRUCTURE WITH SUBMERGENCE SHELL
- 3753494 UNDER-SEA OIL STORAGE INSTALLATION
- 3766583 OFFSHORE LIQUEFIED GAS TERMINAL
OTHER KEYWORDS: SEABED FOUNDATION
- 3769803 SUBMERGED STORAGE VESSEL
OTHER KEYWORDS: SEABED FOUNDATION
- 3777497 STORAGE TANK FOR OFFSHORE STORAGE OF LIQUID AND METHOD
OF CONSTRUCTING AND INSTALLING SAME.OTHER KEYWORDS:
SEABED FOUNDATION
- 3779024 STATIONARY STORAGE AND MOORING PLANT RESTING ON THE BOTTOM
OF THE SEA.OTHER KEYWORDS: BREAKWATER, CONCRETE ; OFFSHORE CAISSON ;
OFFSHORE HARBOR ; PIER, FIXED ; SEABED FOUNDATION

OFFSHORE STORAGE TANK, SUBMERGED

- 3553969 SUBMERGED OIL STORAGE STRUCTURE
OTHER KEYWORDS: OFFSHORE PLATFORM ANCHOR ;
OFFSHORE PLATFORM, FLOATING
- 3572306 UNDERWATER STORAGE TANK
OTHER KEYWORDS: SEABED WATER, PROCESS STRUCTURE
- 3621662 UNDERWATER STORAGE STRUCTURE AND METHOD OF INSTALLATION
OTHER KEYWORDS: OFFSHORE CONSTRUCTION
- 3665721 SUBMERGED WELL PLATFORM
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED
- 3680275 UNDERWATER STORAGE TANKS
- 3686811 SPACED MULTI-WALL CONSTRUCTION UNIT
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED ;
SEABED FOUNDATION
- 3686875 SUBMERGED STORAGE UNIT
- 3695047 UNDERWATER LIQUID STORAGE FACILITY
OTHER KEYWORDS: SEABED FOUNDATION
- 3708986 IMMERSIBLE RESERVOIR
OTHER KEYWORDS: OFFSHORE CONSTRUCTION
- 3708987 CONCRETE RESERVOIR FOR UNDERWATER USE
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ; SEABED FOUNDATION
- 3710582 UNIQUE SUBSEA STORAGE VESSEL AND UNIQUE METHOD OF LOWERING SAME
OTHER KEYWORDS: OFFSHORE CONSTRUCTION
- 3712068 OFFSHORE INSTALLATION FOR PRODUCING, STORING AND LOADING OIL
FROM UNDERWATER OIL WELL.OTHER KEYWORDS: BREAKWATER, FLOATING ;
OFFSHORE MOORING STRUCTURE ; OFFSHORE PLATFORM ANCHOR ;
OFFSHORE PLATFORM, FLOATING
- 3713415 SHIP MOORING ARRANGEMENT AND A SUBMERGED OIL STORAGE TANK
OTHER KEYWORDS: OFFSHORE MOORING STRUCTURE ;
OFFSHORE PLATFORM, FIXED ; OFFSHORE STRUCTURE FENDER
- 3719048 OFFSHORE STRUCTURE WITH STATIC AND DYNAMIC STABILIZATION SHELL

OFFSHORE STRUCTURE FENDER

- 3552131 OFFSHORE INSTALLATION
OTHER KEYWORDS: COLLISION PROTECTION ; ICE PROTECTION ;
OFFSHORE PLATFORM, FIXED ; OFFSHORE STORAGE TANK, EMERGENT
- 3564858 BOAT LANDING FOR OFFSHORE STRUCTURE
OTHER KEYWORDS: OFFSHORE MOORING STRUCTURE
- 3584464 INFLATABLE MARINE FENDER
OTHER KEYWORDS: COLLISION PROTECTION
- 3593531 MARINE FENDER
OTHER KEYWORDS: COLLISION PROTECTION
- 3630161 MULTIPLE PURPOSE FLOATING CONCRETE RING
OTHER KEYWORDS: OFFSHORE PLATFORM ANCHOR ; OFFSHORE PLATFORM, FIXED ;
OFFSHORE STORAGE TANK, EMERGENT ; SEALED FOUNDATION
- 3669052 METHOD AND APPARATUS FOR PREVENTING ICE DAMAGE TO MARINE STRUCTURES
OTHER KEYWORDS: ICE PROTECTION ; OFFSHORE MOORING STRUCTURE ;
OFFSHORE PLATFORM, FIXED
- 3672175 ICE CUTTER
OTHER KEYWORDS: ICE PROTECTION ; OFFSHORE MOORING STRUCTURE
- 3675610 MOORING STRUCTURE IN COMBINATION WITH A FENDER
OTHER KEYWORDS: OFFSHORE MOORING STRUCTURE ; OFFSHORE PLATFORM, FIXED
- 3693360 ICE BREAKER FOR MARINE STRUCTURES
OTHER KEYWORDS: ICE PROTECTION ; OFFSHORE PLATFORM, FIXED ;
OFFSHORE PLATFORM, LEG
- 3696624 BUCKET WHEEL ICE CUTTER
OTHER KEYWORDS: ICE PROTECTION
- 3713415 SHIP MOORING ARRANGEMENT AND A SUBMERGED OIL STORAGE TANK
OTHER KEYWORDS: OFFSHORE MOORING STRUCTURE ;
OFFSHORE PLATFORM, FIXED ; OFFSHORE STORAGE TANK, SUBMERGED
- 3742715 PROTECTING A STRUCTURE IN WATER COVERED WITH SHEET ICE
OTHER KEYWORDS: ICE PROTECTION ; ICE STRUCTURE
- 3759045 MONOMOORING SEA PLATFORM
OTHER KEYWORDS: COLLISION PROTECTION ; OFFSHORE MOORING STRUCTURE ;
OFFSHORE PLATFORM, FIXED
- 3759046 MOVEMENT OF MARINE STRUCTURES IN SALINE ICE
OTHER KEYWORDS: ICE PROTECTION ; OFFSHORE MOORING STRUCTURE ;
OFFSHORE PLATFORM, LEG ; PILE PROTECTION

PIER FENDER

- 3555832 FENDER
- 3570257 DOCK AND DOLPHIN PROTECTOR
OTHER KEYWORDS: PILE DOLPHIN
- 3572045 PIER ASSEMBLY
OTHER KEYWORDS: PIER, FIXED ; PIER, MOBILE ; SMALL CRAFT PIER ;
TIRES
- 3585802 DOCKING AND FENDERING SYSTEM
- 3600896 MARINE FENDER ASSEMBLY

3630035 BARRIER WHICH MAY BE USED FOR THE PROTECTION
OF HARBOR INSTALLATIONS. OTHER KEYWORDS: PILE DOLPHIN

3677017 DOCK FENDER STRUCTURE

3688729 DYNAMIC FENDERING SYSTEM

3690280 FENDER FOR LARGE SHIP

3693572 MARINE FENDER

3695046 FENDERS

3708988 FENDER ASSEMBLY

3716999 MECHANICAL BUFFER OF RESILIENT MATERIAL SUCH AS RUBBER,
IN PARTICULAR FENDER FOR SHIPS

3763653 CUSHIONED DOCK FENDER STRUCTURE AND SHEAR TYPE CUSHION MEMBER

3766739 OIL SPILLAGE ENCLOSURE SYSTEM FOR MARINE USE
OTHER KEYWORDS: POLLUTANT, SURFACE BARRIER

3773008 FENDER DEVICE FOR SHIPS AND OTHER BOATS

3827318 DOCK FENDER

PIER, FIXED

3568451 PORTABLE DOCK
OTHER KEYWORDS: PIER, MOBILE ; SMALL-CRAFT PIER

3572045 PIER ASSEMBLY
OTHER KEYWORDS: PIER FENDER ; PIER, MOBILE ; SMALL-CRAFT PIER ;
TIRES

3614871 METHOD, APPARATUS, AND DOCK MEMBER COMPONENTS FOR ERECTING, ALIGNING,
REALIGNING, OR DISASSEMBLING A DOCK MEMBER. OTHER KEYWORDS:
OFFSHORE CONSTRUCTION ; PIER, MOBILE ; SMALL-CRAFT PIER

3620027 DOCK STRUCTURE
OTHER KEYWORDS: PIER, FLOATING ; SMALL-CRAFT PIER

3653218 HYDRAULIC CONSTRUCTION AND METHOD FOR BUILDING SAME
OTHER KEYWORDS: GROUTING ; OFFSHORE PLATFORM, FIXED ;
OFFSHORE PLATFORM, LEG ; PILE DOLPHIN ; SEABED FOUNDATION

3686876 REMOVABLE PIER CONSTRUCTION
OTHER KEYWORDS: PIER, MOBILE ; SEABED FOUNDATION ; SMALL-CRAFT PIER

3708983 APPARATUS FOR CONFINING OIL SPILLS
OTHER KEYWORDS: POLLUTANT, SURFACE BARRIER

3747354 RETRACTABLE PIER
OTHER KEYWORDS: PIER, MOBILE ; SMALL-CRAFT PIER

3779024 STATIONARY STORAGE AND MOORING PLANT RESTING ON THE BOTTOM
OF THE SEA. OTHER KEYWORDS: BREAKWATER, CONCRETE ; OFFSHORE CAISSON ;
OFFSHORE HARBOR ; OFFSHORE STORAGE TANK, EMERGENT ; SEABED FOUNDATION

PIER, FLOATING

3552424 FLOATING LIFT STATION
OTHER KEYWORDS: POLLUTANT COLLECTION ;
SMALL-CRAFT SERVICE STRUCTURE

3559762 SAFETY LADDER FOR WATER USE
 OTHER KEYWORDS: SMALL-CRAFT PIER

3580202 FLOATING WHARF STRUCTURE
 OTHER KEYWORDS: SMALL-CRAFT PIER

3587503 MEANS FOR CONSTRUCTING BUOYANT PLATFORMS
 OTHER KEYWORDS: OFFSHORE CONSTRUCTION

3602925 FLOATING SWIMMING POOL
 OTHER KEYWORDS: SMALL-CRAFT PIER

3616774 FLOATING DOCK STRUCTURE
 OTHER KEYWORDS: SMALL-CRAFT PIER

3620027 DOCK STRUCTURE
 OTHER KEYWORDS: PIER, FIXED ; SMALL-CRAFT PIER

3636908 MOBILE DOCK FOR SMALL-CRAFT
 OTHER KEYWORDS: PIER, MOBILE ; SMALL-CRAFT PIER

3643448 FLOATING LANDING STAGES
 OTHER KEYWORDS: SMALL-CRAFT PIER

3654885 FLOATING DOCK SECTION
 OTHER KEYWORDS: SMALL-CRAFT PIER

3659540 MONOLITHIC FLOATING WHARVES
 OTHER KEYWORDS: SMALL-CRAFT PIER

3662559 ANCHORAGE FOR BOAT DOCKS
 OTHER KEYWORDS: PILE FOOTING ; SANDBAG ; SEABED FOUNDATION ;
 SMALL-CRAFT PIER

3672178 ROTARY DOCK
 OTHER KEYWORDS: SMALL-CRAFT PIER

3673976 SECTIONALIZED PONTOON APPARATUS
 OTHER KEYWORDS: SMALL-CRAFT PIER

3680160 FLOAT- FOR SEAMARKS, BUOYS, PONTOONS AND THE LIKE
 OTHER KEYWORDS: BUOY MOORING SYSTEM ; ICE PROTECTION ;
 SMALL-CRAFT MOORING DEVICE

3683838 MOORING DEVICE FOR FLOATING BOAT HOIST
 OTHER KEYWORDS: SMALL-CRAFT PIER ; SMALL-CRAFT SERVICE STRUCTURE

3695207 ANCHORAGE FOR BOAT DOCK, BUOY OR THE LIKE
 OTHER KEYWORDS: BUOY MOORING SYSTEM ; SMALL-CRAFT PIER

3726098 MODULAR DOCK FLOAT
 OTHER KEYWORDS: SMALL-CRAFT PIER

3731761 FLOATING PIER WITH SELF ADJUSTING STAIRWAY ASSEMBLY
 OTHER KEYWORDS: SMALL-CRAFT SERVICE STRUCTURE

3752102 FLOATING DOCK OR THE LIKE AND FLOATATION UNIT FOR USE THEREWITH
 OTHER KEYWORDS: SMALL-CRAFT PIER

3760754 MODULAR UNIT FOR A FLOATING DOCK SYSTEM
 OTHER KEYWORDS: SMALL-CRAFT PIER

3763808 UNIVERSAL MARINE MODULE
 OTHER KEYWORDS: SMALL-CRAFT PIER

3779192 MODULAR CONCRETE FLOATATION UNIT
 OTHER KEYWORDS: SMALL-CRAFT PIER

PIER, MOBILE

- 3568451 PORTABLE DOCK
OTHER KEYWORDS: PIER, FIXED ; SMALL-CRAFT PIER
- 3572045 PIER ASSEMBLY
OTHER KEYWORDS: PIER FENDER ; PIER, FIXED ; SMALL-CRAFT PIER ; TIRES
- 3614871 METHOD, APPARATUS, AND DOCK MEMBER COMPONENTS FOR ERECTING, ALIGNING, REALIGNING, OR DISASSEMBLING A DOCK MEMBER. OTHER KEYWORDS:
OFFSHORE CONSTRUCTION ; PIER, FIXED ; SMALL-CRAFT PIER
- 3636908 MOBILE DOCK FOR SMALL-CRAFT
OTHER KEYWORDS: PIER, FLOATING ; SMALL-CRAFT PIER
- 3686876 REMOVABLE PIER CONSTRUCTION
OTHER KEYWORDS: PIER, FIXED ; SEABED FOUNDATION ; SMALL-CRAFT PIER
- 3747354 RETRACTABLE PIER
OTHER KEYWORDS: PIER, FIXED ; SMALL-CRAFT PIER

PILE DOLPHIN

- 3570257 DOCK AND DOLPHIN PROTECTOR
OTHER KEYWORDS: PIER FENDER
- 3630035 BARRIER WHICH MAY BE USED FOR THE PROTECTION OF HARBOR INSTALLATIONS
OTHER KEYWORDS: PIER FENDER
- 3653218 HYDRAULIC CONSTRUCTION AND METHOD FOR BUILDING SAME
OTHER KEYWORDS: GROUTING ; OFFSHORE PLATFORM, FIXED ;
OFFSHORE PLATFORM, LEG ; PIER, FIXED ; SEABED FOUNDATION
- 3724222 MOORING STRUCTURE AND METHOD
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE MOORING STRUCTURE ;
PILE, STEEL

PILE DRIVER LEADS

- 3657896 METHOD OF CONSTRUCTING CONTINUOUS WALL BY USE OF PILES
OR PILE SHEETS AND APPARATUS THEREFOR. OTHER KEYWORDS: BULKHEAD ;
OFFSHORE CONSTRUCTION ; PILE DRIVER, IMPACT ; PILE PLACEMENT
- 3666026 DEVICE FOR GRIPPING AND ACTUATING A BORING TUPE, FOUNDATION PILE
OR THE LIKE
- 3751930 ARTICULATED MARINE STRUCTURE WITH PREPOSITIONED ANCHORING PILES
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED ;
PILE PLACEMENT ; SEABED FOUNDATION
- 3754403 OFFSHORE MARINE STRUCTURE EMBODYING ANCHOR PILE MEANS
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED ;
PILE PLACEMENT ; SEABED FOUNDATION

PILE DRIVER, IMPACT

- 3595324 PILE DRIVERS INCLUDING MULTIPLE HAMMERS WITH COMMON ANVILS
- 3604519 METHOD OF CREATING UNDERWATER THRUSTS TO DRIVE A MEMBER
INTO THE EARTH. OTHER KEYWORDS: EMBEDMENT ANCHOR ;
OFFSHORE CONSTRUCTION
- 3604522 PILE-DRIVING SYSTEM AND APPARATUS
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE PLACEMENT

3612188 NOISELESS PILE DRIVER

3625013 EXPANSIBLE MANDRELS FOR USE IN DRIVING OR WITHDRAWING TUBULAR PILES
OTHER KEYWORDS: PILE EXTRACTOR

3635292 PILE GRIPS

3638738 PILE DRIVING APPARATUS
OTHER KEYWORDS: OFFSHORE CONSTRUCTION

3651873 IMPACTING APPARATUS FOR DRIVING CONVERTIBLE TO PULLING
OTHER KEYWORDS: PILE EXTRACTOR

3657896 METHOD OF CONSTRUCTING CONTINUOUS WALL BY USE OF PILES
OR PILE SHEETS AND APPARATUS THEREFOR. OTHER KEYWORDS:
BULKHEAD ; OFFSHORE CONSTRUCTION ; PILE DRIVER LEADS ;
PILE PLACEMENT

3669198 FLUID OPERATED DROP HAMMER WITH VALVED PISTON

3679005 DIESEL HAMMER

3680644 PILE DRIVING SYSTEM AND APPARATUS
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE, STEEL

3700046 TWO-STAGE DROP HAMMER FOR DRIVING LARGE DIAMETER PILING
OTHER KEYWORDS: OFFSHORE CONSTRUCTION

3714789 AUTOMATICALLY SELF-REGULATING VARIABLE-STROKE, VARIABLE-RATE
AND QUIET-OPERATING PILE DRIVER METHOD AND SYSTEM
OTHER KEYWORDS: PILE EXTRACTOR

3721095 CONTROLLABLE FORCE METHOD AND SYSTEM OF DRIVING PILES
OTHER KEYWORDS: PILE LOAD MEASUREMENT

3734206 POWER-OPERATED HAMMER

3743030 MECHANICAL PILE DRIVING HAMMER

3747693 DIESEL PILE DRIVER FOR IMPACT ATOMIZATION

PILE DRIVER, VIBRATORY

3583497 AN IMPROVED VIBRATING POWER HAMMER FOR DRIVING AND EXTRACTING PILES
OTHER KEYWORDS: PILE EXTRACTOR

3608651 APPARATUS FOR DRIVING ELONGATED ELEMENTS INTO UNDERWATER GROUNDS
OTHER KEYWORDS: EMBEDMENT ANCHOR ; OFFSHORE CONSTRUCTION ;
PILE PLACEMENT ; SAMPLER, SEABED-DRIVEN CORE

3620026 PILE DRIVING METHOD AND APPARATUS
OTHER KEYWORDS: PILE EXTRACTOR

3645345 DYNAMIC PILE-DRIVING SHOES
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE-DRIVING SHOE

3650335 APPARATUS FOR DRIVING AND/OR EXTRACTING PILES
OTHER KEYWORDS: PILE EXTRACTOR

3677018 METHOD FOR DRIVING A FOUNDATION ELEMENT INTO THE EARTH BY MEANS
OF VIBRATION. OTHER KEYWORDS: GROUTING ; PILE-DRIVING SHOE ;
PILE FOOTING ; PILE, STEEL

3686877 SONIC METHOD AND APPARATUS FOR INSTALLING OFF-SHORE CAISSONS
FOR OIL OPERATIONS AND THE LIKE. OTHER KEYWORDS: OFFSHORE CAISSON ;
OFFSHORE CONSTRUCTION

PILE DRIVER, WATER JET

- 3608320 METHOD AND APPARATUS FOR CONSTRUCTING A CONCRETE WALL STRUCTURE
IN OPEN WATER. OTHER KEYWORDS: CONCRETE FORM ; OFFSHORE CAISSON ;
OFFSHORE CONSTRUCTION ; PILE-DRIVING SHOE ; SEABED FOUNDATION
- 3630036 ELONGATED ELEMENT TO BE DRIVEN INTO THE GROUND TOGETHER WITH A SHOE
OTHER KEYWORDS: CONCRETE FORM ; PILE, CONCRETE ; PILE-DRIVING SHOE
- 3636718 WATER JETTED PILING
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE, CONCRETE ;
PILE-DRIVING SHOE
- 3664139 REMOVABLE SELF-JETTING PILE
OTHER KEYWORDS: CONCRETE FORM ; PILE, CONCRETE
- 3763654 PILE DRIVING AND DRAWING APPARATUS
OTHER KEYWORDS: PILE EXTRACTOR
- 3763656 PLACING OFFSHORE SUPPORTING ELEMENTS
OTHER KEYWORDS: EMBEDMENT ANCHOR ; OFFSHORE CONSTRUCTION ;
PILE FOOTING ; SEABED FOUNDATION ; SEABED SOIL TREATMENT

PILE-DRIVING SHOE

- 3608320 METHOD AND APPARATUS FOR CONSTRUCTING A CONCRETE WALL STRUCTURE
IN OPEN WATER. OTHER KEYWORDS: CONCRETE FORM ; OFFSHORE CAISSON ;
OFFSHORE CONSTRUCTION ; PILE DRIVER, WATER JET ; SEABED FOUNDATION
- 3618328 BEARING SUPPORT FOR PILING
OTHER KEYWORDS: PILE FOOTING
- 3630036 ELONGATED ELEMENT TO BE DRIVEN INTO THE GROUND TOGETHER WITH A SHOE
OTHER KEYWORDS: CONCRETE FORM ; PILE, CONCRETE ; PILE DRIVER, WATER JET
- 3636718 WATER JETTED PILING
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE, CONCRETE ;
PILE DRIVER, WATER JET
- 3645345 DYNAMIC PILE DRIVING SHOES
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE DRIVER, VIBRATORY
- 3668877 PILE SECTION FOR FORMING A PILOT HOLE
OTHER KEYWORDS: PILE, STEEL
- 3677018 METHOD FOR DRIVING A FOUNDATION ELEMENT INTO THE EARTH BY MEANS
OF VIBRATION. OTHER KEYWORDS: GROUTING ; PILE DRIVER, VIBRATORY ;
PILE FOOTING ; PILE, STEEL
- 3724223 ONE PIECE, DRIVE FIT, CLOSURE CAP AND SLEEVE FOR PILES
OTHER KEYWORDS: PILE SECTION CONNECTION ; PILE, STEEL

PILE EXTRACTOR

- 3583497 AN IMPROVED VIBRATING POWER HAMMER FOR DRIVING AND EXTRACTING PILES
OTHER KEYWORDS: PILE DRIVER, VIBRATORY
- 3583499 HYDRAULIC PILE EXTRACTOR
- 3620026 PILE DRIVING METHOD AND APPARATUS
OTHER KEYWORDS: PILE DRIVER, VIBRATORY
- 3625013 EXPANSIBLE MANDRELS FOR USE IN DRIVING OR WITHDRAWING TUBULAR PILES
OTHER KEYWORDS: PILE DRIVER, IMPACT

- 3650335 APPARATUS FOR DRIVING AND/OR EXTRACTING PILES
OTHER KEYWORDS: PILE DRIVER, VIBRATORY
- 3651873 IMPACTING APPARATUS FOR DRIVING CONVERTIBLE TO PULLING
OTHER KEYWORDS: PILE DRIVER, IMPACT
- 3714789 AUTOMATICALLY SELF-REGULATING VARIABLE-STROKE, VARIABLE-RATE
AND QUIET-OPERATING PILE DRIVER METHOD AND SYSTEM
OTHER KEYWORDS: PILE DRIVER, IMPACT
- 3763654 PILE DRIVING AND DRAWING APPARATUS
OTHER KEYWORDS: PILE DRIVER, WATER JET

PILE FOOTING

- 3618328 BEARING SUPPORT FOR PILING
OTHER KEYWORDS: PILE-DRIVING SHOE
- 3662559 ANCHORAGE FOR BOAT DOCKS
OTHER KEYWORDS: PIER, FLOATING ; SANDBAG ; SEABED FOUNDATION ;
SMALL-CRAFT PIER
- 3677018 METHOD FOR DRIVING A FOUNDATION ELEMENT INTO THE EARTH BY MEANS
OF VIBRATION, OTHER KEYWORDS: GROUTING ; PILE DRIVER, VIBRATORY ;
PILE-DRIVING SHOE ; PILE, STEEL
- 3677113 METHOD AND APPARATUS FOR FORMING A FOUNDATION-LEG ASSEMBLY
FOR AN OFFSHORE PLATFORM, OTHER KEYWORDS: OFFSHORE CONSTRUCTION ;
OFFSHORE PLATFORM, LEG ; PILE, CONCRETE ; PILE, STEEL ; SEABED
FOUNDATION
- 3763656 PLACING OFFSHORE SUPPORTING ELEMENTS
OTHER KEYWORDS: EMBEDMENT ANCHOR ; OFFSHORE CONSTRUCTION ;
PILE DRIVER, WATER JET ; SEABED FOUNDATION ; SEABED SOIL TREATMENT

PILE LOAD MEASUREMENT

- 3648514 MEANS FOR MEASURING FORCES, NOTABLY AT THE FOOT OF AN
OSCILLATING COLUMN OR AN OFFSHORE DRILLING PLATFORM, OTHER KEYWORDS:
OFFSHORE PLATFORM ANCHOR ; OFFSHORE PLATFORM, FLOATING
- 3721095 CONTROLLABLE FORCE METHOD AND SYSTEM OF DRIVING PILES
OTHER KEYWORDS: PILE DRIVER, IMPACT

PILE PLACEMENT

- 3575005 METHOD AND APPARATUS FOR OFFSHORE OPERATIONS
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, JACK UP ;
SEABED FOUNDATION
- 3592012 Laterally Reinforced Offshore Platform
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ; SEABED FOUNDATION
- 3604522 PILE-DRIVING SYSTEM AND APPARATUS
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE DRIVER, IMPACT
- 3608651 APPARATUS FOR DRIVING ELONGATED ELEMENTS INTO UNDERWATER GROUNDS
OTHER KEYWORDS: EMBEDMENT ANCHOR ; OFFSHORE CONSTRUCTION ;
PILE DRIVER, VIBRATORY ; SAMPLER, SEABED-DRIVEN CORE
- 3638436 REVERSED SLOPE SKIRT PILE MARINE PLATFORM ANCHORING
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ; SEABED FOUNDATION

- 3657896 METHOD OF CONSTRUCTING CONTINUOUS WALL BY USE OF PILES
OR PILE SHEETS AND APPARATUS THEREFOR OTHER KEYWORDS: BULKHEAD ;
OFFSHORE CONSTRUCTION ; PILE DRIVER, IMPACT ; PILE DRIVER LEADS
- 3672177 SURGEA FOUNDATION UNIT AND METHOD OF INSTALLATION
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; SEABED FOUNDATION ;
SEABED OIL, PROCESS STRUCTURE
- 3751930 ARTICULATED MARINE STRUCTURE WITH PREPOSITIONED ANCHORING PILES
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED ;
PILE DRIVER LEADS ; SEABED FOUNDATION
- 3754403 OFFSHORE MARINE STRUCTURE EMBODYING ANCHOR PILE MEANS
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED ;
PILE DRIVER LEADS ; SEABED FOUNDATION
- 3756033 OFFSHORE STRUCTURE WITH ROTATING AND INDEXING MECHANISM
FOR PLACING PILES. OTHER KEYWORDS: OFFSHORE CONSTRUCTION ;
OFFSHORE PLATFORM, ANCHOR ; OFFSHORE PLATFORM, FLOATING

PILE PROTECTION

- 3553970 INFLATABLE CLAMPING DEVICE
OTHER KEYWORDS: COATING ; CORROSION PREVENTION
- 3713049 CORROSION PREVENTING APPARATUS AND METHOD
OTHER KEYWORDS: COATING ; CORROSION PREVENTION
- 3736759 PILE COVERING
OTHER KEYWORDS: COATING ; CORROSION PREVENTION
- 3759046 MOVEMENT OF MARINE STRUCTURES IN SALINE ICE
OTHER KEYWORDS: ICE PROTECTION ; OFFSHORE MOORING STRUCTURE ;
OFFSHORE PLATFORM, LEG ; OFFSHORE STRUCTURE FENDER
- RE27460 METHOD FOR ENCASING RIGID MEMBERS WITH CONCRETE
OTHER KEYWORDS: CONCRETE FORM ; STRUCTURE REPAIR

PILE SECTION CONNECTION

- 3553922 GLUED-LAMINAE PILE
OTHER KEYWORDS: PILE, SHEET ; PILE, WOOD
- 3585803 PILE SPLICE
OTHER KEYWORDS: PILE, STEEL
- 3593532 CONCRETE PILE SECTIONS AND JOINTS THEREFOR
OTHER KEYWORDS: PILE, CONCRETE
- 3625012 SELF-LOCKING PILE JOINT
OTHER KEYWORDS: PILE, CONCRETE
- 3651653 SECTIONAL PILE AND COUPLING MEANS
OTHER KEYWORDS: PILE, CONCRETE
- 3688508 SHEET PILING CONNECTORS
OTHER KEYWORDS: PILE, SHEET ; PILE, STEEL
- 3688509 METHOD OF ASSEMBLING A SHEET PILING IN THE EARTH FROM SHEET PILE
SECTIONS; AS WELL AS A SHEET PILE SECTION SUITABLE FOR APPLICATION
IN THIS METHOD. OTHER KEYWORDS: PILE, SHEET ; PILE, STEEL
- 3703085 SHEET PILE SECTION
OTHER KEYWORDS: PILE, SHEET ; PILE, STEEL

- 3720068 METHOD AND APPARATUS FOR SPLICING REPLACEMENT PILE SECTION
TO PILE STUB.OTHER KEYWORDS: PILE,WOOD ; STRUCTURE REPAIR
- 3724223 ONE PIECE, DRIVE FIT, CLOSURE CAP AND SLEEVE FOR PILES
OTHER KEYWORDS: PILE-DRIVING SHOE ; PILE,STEEL
- 3739588 RESILIENT RETAINING WALL
OTHER KEYWORDS: BULKHEAD ; PILE,SHEET ; PILE,STEEL
- 3748863 CONNECTION FOR A NONMETALLIC FOUNDATION PILE
OTHER KEYWORDS: COATING ; CORROSION PREVENTION ; PILE-CONCRETE

PILE, CONCRETE

- 3593532 CONCRETE PILE SECTIONS AND JOINTS THEREFOR
OTHER KEYWORDS: PILE SECTION CONNECTION
- 3597930 METHOD AND APPARATUS FOR REINFORCING IN SITU IN PILE CASING
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM,LEG ;
PILE,STEEL ; STRUCTURE REPAIR
- 3599383 PILE-AND-CONCRETE CONNECTOR
OTHER KEYWORDS: PILE,STRUCTURE CONNECTION ; PILE,WOOD
- 3602000 REINFORCED STEEL PIPE PILING STRUCTURE
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM,LEG ;
PILE,STEEL ; STRUCTURE REPAIR
- 3625012 SELF-LOCKING PILE JOINT
OTHER KEYWORDS: PILE SECTION CONNECTION
- 3630036 ELONGATED ELEMENT TO BE DRIVEN INTO THE GROUND TOGETHER WITH A SHOE
OTHER KEYWORDS: CONCRETE FORM ; PILE DRIVER,WATER JET ;
PILE-DRIVING SHOE
- 3636718 WATER JETTED PILING
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE DRIVER,WATER JET ;
PILE-DRIVING SHOE
- 3646770 METHOD AND APPARATUS FOR STABILIZING AN OFFSHORE DRILLING
PLATFORM STRUCTURE-OTHER KEYWORDS: PILE,STEEL ; SEABED FOUNDATION ;
SEABED SOIL TREATMENT
- 3651653 SECTIONAL PILE AND COUPLING MEANS
OTHER KEYWORDS: PILE SECTION CONNECTION
- 3664139 REMOVABLE SELF-JETTING PILE
OTHER KEYWORDS: CONCRETE FORM ; PILE DRIVER,WATER JET
- 3677113 METHOD AND APPARATUS FOR FORMING A FOUNDATION-LEG ASSEMBLY
FOR AN OFFSHORE PLATFORM-OTHER KEYWORDS: OFFSHORE CONSTRUCTION ;
OFFSHORE PLATFORM,LEG ; PILE FOOTING ; PILE,STEEL ; SEABED
FOUNDATION
- 3726950 METHOD FOR PRODUCING SUB-AQUEOUS AND OTHER CAST-IN-PLACE CONCRETE
STRUCTURES IN SITU.OTHER KEYWORDS: BREAKWATER,CONCRETE ; BULKHEAD ;
CONCRETE FORM ; FABRIC MAT ; OFFSHORE CONSTRUCTION ;
STRUCTURE REPAIR
- 3748863 CONNECTION FOR A NONMETALLIC FOUNDATION PILE
OTHER KEYWORDS: COATING ; CORROSION PREVENTION ;
PILE SECTION CONNECTION

PILE, SHEET

- 3553922 GLUED-LAMINAE PILE
OTHER KEYWORDS: PILE SECTION CONNECTION ; PILE, WOOD
- 3688508 SHEET PILING CONNECTORS
OTHER KEYWORDS: PILE SECTION CONNECTION ; PILE, STEEL
- 3688509 METHOD OF ASSEMBLING A SHEET PILING IN THE EARTH FROM SHEET PILE SECTIONS; AS WELL AS A SHEET PILE SECTION SUITABLE FOR APPLICATION IN THIS METHOD. OTHER KEYWORDS: PILE SECTION CONNECTION ; PILE, STEEL
- 3703085 SHEET PILE SECTION
OTHER KEYWORDS: PILE SECTION CONNECTION ; PILE, STEEL
- 3720067 METHOD FOR BUILDING IMMersed STRUCTURES AND A DEVICE FOR CARRYING OUT SAID METHOD. OTHER KEYWORDS: CHANNEL BARRIER ; GROUTING , OFFSHORE CONSTRUCTION ; PILE, STEEL ; SEABED FOUNDATION
- 3739588 RESILIENT RETAINING WALL
OTHER KEYWORDS: BULKHEAD ; PILE SECTION CONNECTION ; PILE, STEEL
- 3757527 WAVE DEFLECTING DEVICE FOR A SEA WALL
OTHER KEYWORDS: PILE, STEEL ; SEAWALL
- 3768265 COFFERDAM
OTHER KEYWORDS: COFFERDAM ; PILE, STEEL ; STRUCTURE REPAIR

PILE, STEEL

- 3585803 PILE SPLICE
OTHER KEYWORDS: PILE SECTION CONNECTION
- 3597930 METHOD AND APPARATUS FOR REINFORCING IN SITU IN PILE CASING
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, LEG ; PILE, CONCRETE ; STRUCTURE REPAIR
- 3602000 REINFORCED STEEL PIPE PILING STRUCTURE
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, LEG ; PILE, CONCRETE ; STRUCTURE REPAIR
- 3613382 SEA WALL CONSTRUCTION
OTHER KEYWORDS: CONCRETE BLOCK ; OFFSHORE CONSTRUCTION ; SEAWALL
- 3621663 RIBBED PILE
- 3646770 METHOD AND APPARATUS FOR STABILIZING AN OFFSHORE DRILLING PLATFORM STRUCTURE. OTHER KEYWORDS: PILE, CONCRETE ; SEABED FOUNDATION ; SEABED SOIL TREATMENT
- 3668877 PILE SECTION FOR FORMING A PILOT HOLE
OTHER KEYWORDS: PILE-DRIVING SHOE
- 3677018 METHOD FOR DRIVING A FOUNDATION ELEMENT INTO THE EARTH BY MEANS OF VIBRATION. OTHER KEYWORDS: GROUTING ; PILE DRIVER, VIBRATORY ; PILE-DRIVING SHOE ; PILE FOOTING
- 3677113 METHOD AND APPARATUS FOR FORMING A FOUNDATION-LEG ASSEMBLY FOR AN OFFSHORE PLATFORM. OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, LEG ; PILE, CONCRETE ; PILE FOOTING ; SEABED FOUNDATION
- 3680644 PILE DRIVING SYSTEM AND APPARATUS
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE DRIVER, IMPACT

3688508 SHEET PILING CONNECTORS
OTHER KEYWORDS: PILE SECTION CONNECTION ; PILE, SHEET

3688509 METHOD OF ASSEMBLING A SHEET PILING IN THE EARTH FROM SHEET PILE SECTIONS; AS WELL AS A SHEET PILE SECTION SUITABLE FOR APPLICATION IN THIS METHOD. OTHER KEYWORDS: PILE SECTION CONNECTION ; PILE, SHEET

3690110 REPAIRING OR REHABILITATING STEEL SUPPORTED H-PILES
OTHER KEYWORDS: CONCRETE FORM ; STRUCTURE REPAIR

3703085 SHEET PILE SECTION
OTHER KEYWORDS: PILE SECTION CONNECTION ; PILE, SHEET

3720067 METHOD FOR BUILDING IMMERSED STRUCTURES AND A DEVICE FOR CARRYING OUT SAID METHOD. OTHER KEYWORDS: CHANNEL BARRIER ; GROUTING ; OFFSHORE CONSTRUCTION ; PILE, SHEET ; SEABED FOUNDATION

3724222 MOORING STRUCTURE AND METHOD
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE MOORING STRUCTURE ; PILE DOLPHIN

3724223 ONE PIECE, DRIVE FIT, CLOSURE CAP AND SLEEVE FOR PILES
OTHER KEYWORDS: PILE-DRIVING SHOE ; PILE SECTION CONNECTION

3729864 APPARATUS FOR REPAIRING STEEL SUPPORTING PILES
OTHER KEYWORDS: CONCRETE FORM ; STRUCTURE REPAIR

3739588 RESILIENT RETAINING WALL
OTHER KEYWORDS: BULKHEAD ; PILE SECTION CONNECTION ; PILE, SHEET

3757527 WAVE DEFLECTING DEVICE FOR A SEA WALL
OTHER KEYWORDS: PILE, SHEET ; SEAWALL

3768265 COFFERDAM
OTHER KEYWORDS: COFFERDAM ; PILE, SHEET ; STRUCTURE REPAIR

PILE, STRUCTURE CONNECTION

3555831 COMPOSITE FOUNDATION MEMBER AND METHOD
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; SEABED FOUNDATION

3564856 PROCESS AND APPARATUS FOR CEMENTING OFFSHORE SUPPORT MEMBERS
OTHER KEYWORDS: GROUTING ; OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, LEG ; SEABED FOUNDATION

3581508 UPLIFT PILE ANCHORAGE STRUCTURE
OTHER KEYWORDS: PILE, WOOD

3593530 MARINE PLATFORM WITH REMOVAL COLUMN CLAMPS
OTHER KEYWORDS: OFFSHORE PLATFORM, JACK UP ; SEABED FOUNDATION

3599383 PILE-AND-CONCRETE CONNECTOR
OTHER KEYWORDS: PILE, CONCRETE ; PILE, WOOD

3601999 METHODS OF GROUTING OFFSHORE STRUCTURES
OTHER KEYWORDS: GROUTING ; OFFSHORE CONSTRUCTION

3606716 TIMBER PILING CONSTRUCTION
OTHER KEYWORDS: PILE, WOOD

3648466 ELEVATED RESERVOIR FOR USE WITH OFF-SHORE OIL WELLS
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED ; OFFSHORE STORAGE TANK, EMERGENT

3702537 GROUTING SEAL FOR PILING
OTHER KEYWORDS: GROUTING ; OFFSHORE PLATFORM, LEG

3706205 APPARATUS AND METHOD OF MAKING AN UNDERWATER CONNECTION
BETWEEN A STRUCTURAL MEMBER AND A SUPPORTING PILE
OTHER KEYWORDS: GROUTING ; OFFSHORE CAISSON ; SEABED FOUNDATION

PILE, WOOD

3553322 JOINED-LAMINAE PILE
OTHER KEYWORDS: PILE SECTION CONNECTION ; PILE, SHEET

3581508 UPLIFT PILE ANCHORAGE STRUCTURE
OTHER KEYWORDS: PILE STRUCTURE CONNECTION

3599383 PILE-AND-CONCRETE CONNECTOR
OTHER KEYWORDS: PILE, CONCRETE ; PILE, STRUCTURE CONNECTION

3606716 TIMBER PILING CONSTRUCTION
OTHER KEYWORDS: PILE, STRUCTURE CONNECTION

3673407 RADIOGRAPHIC APPARATUS FOR UNDERWATER INSPECTION OF WOODEN PILINGS
OTHER KEYWORDS: INSTRUMENT, RADIOISOTOPE ; STRUCTURE INSPECTION

3720068 METHOD AND APPARATUS FOR SPLICING REPLACEMENT PILE SECTION TO PILE STUB
OTHER KEYWORDS: PILE SECTION CONNECTION ; STRUCTURE REPAIR

POLLUTANT ABSORPTION

3555257 FLOATING BARRIER FOR WATER POLLUTANTS
OTHER KEYWORDS: POLLUTANT, SURFACE BARRIER

3581899 APPARATUS FOR SEPARATING OIL FROM WATER SURFACE
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, MECHANICAL REMOVAL ;
POLLUTANT REMOVAL WATERCRAFT

3598729 METHOD OF REMOVING OIL SLICKS FROM WATER SURFACES

3607741 OIL SLICK REMOVAL SYSTEM
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, MECHANICAL REMOVAL

3608727 APPARATUS FOR REMOVING OIL AND DEBRIS FROM WATER
OTHER KEYWORDS: POLLUTANT DEBRIS ; POLLUTANT, MECHANICAL REMOVAL

3617552 OIL-WATER SEPARATING PROCESS
OTHER KEYWORDS: POLLUTANT, MECHANICAL REMOVAL

3617556 ERADICATING OIL SLICKS
OTHER KEYWORDS: POLLUTANT, MECHANICAL REMOVAL

3617564 REMOVING OIL OR OIL SUBSTANCE FROM WATER AND LAND AREAS
USING CORNCOB COMPONENTS

3617565 METHOD AND MEANS FOR THE ABSORPTION OF PETROLEUM PRODUCTS
OTHER KEYWORDS: POLLUTANT, SURFACE BARRIER

3617566 METHOD AND MATERIAL FOR SEPARATING OIL FROM OIL-CONTAINING WATER
OTHER KEYWORDS: POLLUTANT, SURFACE BARRIER

3630891 METHOD OF REMOVING OIL FROM THE SURFACE OF WATER
OTHER KEYWORDS: POLLUTANT, MECHANICAL REMOVAL

3634227 OIL SLICK ELIMINATION

3657119 POLLUTION CONTROL DEVICE
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SURFACE BARRIER

3659715 APPARATUS FOR REMOVING OIL FLOATING ON WATER
OTHER KEYWORDS: POLLUTANT BURNING

- 3668118 OIL MOP AND METHOD OF USING SAME
OTHER KEYWORDS: POLLUTANT, MECHANICAL REMOVAL
- 3669275 APPARATUS FOR REMOVING OIL FROM WATER
OTHER KEYWORDS: POLLUTANT, SUCTION REMOVAL
- 3674683 PROCESS FOR THE REMOVAL OF OIL FROM THE SURFACE OF A BODY OF WATER
- 3679058 OIL COLLECTION BOOM
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, MECHANICAL REMOVAL ;
POLLUTANT, SURFACE BARRIER
- 3698850 PROMOTION OF BURNING OF OIL SLICKS WITH PARTICULATE,
FOAMED ALKALI METAL SILICATES. OTHER KEYWORDS: POLLUTANT BURNING ;
POLLUTANT DISPERSION
- 3700593 APPARATUS AND METHOD FOR REMOVING OIL PRODUCTS FLOATING ON WATER
OTHER KEYWORDS: POLLUTANT, MECHANICAL REMOVAL
- 3701258 BUOYANT PULLEY LOCATING AND ANCHORING DEVICE FOR AN OIL MOP
OTHER KEYWORDS: POLLUTANT, MECHANICAL REMOVAL
- 3702297 OIL SKIPPING DEVICE AND METHOD
OTHER KEYWORDS: POLLUTANT, MECHANICAL REMOVAL
- 3702657 POLLUTION CONTAINMENT BARRIER
OTHER KEYWORDS: POLLUTANT, SURFACE BARRIER
- 3703464 TREATMENT OF OIL SPILLS
OTHER KEYWORDS: POLLUTANT COLLECTION
- 3729411 METHOD OF REMOVING OIL FROM WATER
- 3732161 METHOD FOR REMOVING OIL AND DEBRIS FROM WATER
OTHER KEYWORDS: POLLUTANT DEBRIS ; POLLUTANT, MECHANICAL REMOVAL
- 3732162 METHOD OF REMOVING OIL SPILLS FROM WATER
- 3734294 POLLUTANT RECOVERY SYSTEM
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, MECHANICAL REMOVAL ;
POLLUTANT REMOVAL WATERCRAFT
- 3739913 DEVICE FOR FENCING AND ABSORBING CONTAMINATING OIL SPILLS ON WATER
OTHER KEYWORDS: POLLUTANT, SURFACE BARRIER
- 3744257 WATER-SURFACE CLEANSING SHIP
OTHER KEYWORDS: POLLUTANT, MECHANICAL REMOVAL ;
POLLUTANT REMOVAL WATERCRAFT
- 3744638 OIL MOP AND METHOD OF USING SAME
OTHER KEYWORDS: POLLUTANT, MECHANICAL REMOVAL
- 3749667 DISPOSAL OF OIL SPILL AT SEA
OTHER KEYWORDS: POLLUTANT BURNING
- 3770626 SORBENT BELT
OTHER KEYWORDS: POLLUTANT, MECHANICAL REMOVAL
- 3771653 COMPOST FOR REMOVING OIL FILMS FROM WATER
- POLLUTANT BURNING
- 3554290 OIL POLLUTION CONTROL AND FIRE EXTINGUISHING APPARATUS AND METHOD
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SUCTION REMOVAL ;
POLLUTANT, SURFACE BARRIER

- 3586469 PROCESS OF BURNING-OFF OIL ON THE SURFACE OF WATER BASINS
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT REMOVAL WATERCRAFT ;
POLLUTANT, SURFACE BARRIER
- 3602299 OIL OR GAS POLLUTION CONTROL APPARATUS AND METHOD
OTHER KEYWORDS: POLLUTANT COLLECTION
- 3659715 APPARATUS FOR REMOVING OIL FLOATING ON WATER
OTHER KEYWORDS: POLLUTANT ABSORPTION
- 3664429 APPARATUS FOR PREVENTING POLLUTION FROM OFFSHORE OIL WELLS
OTHER KEYWORDS: POLLUTANT COLLECTION
- 3698850 PROMOTION OF BURNING OF OIL SLICKS WITH PARTICULATE,
FOAMED ALKALI METAL SILICATES. OTHER KEYWORDS: POLLUTANT ABSORPTION ;
POLLUTANT DISPERSION
- 3705782 DESTRUCTION OF OIL SLICKS
- 3724555 FLOATING FIRE EXTINGUISHING APPARATUS AND CATCH BASIN
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT REMOVAL WATERCRAFT ;
POLLUTANT, SUCTION REMOVAL
- 3730278 SAFETY ENCLOSURE FOR OFF-SHORE OIL RIGS
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SUCTION REMOVAL ;
POLLUTANT, SURFACE BARRIER
- 3749667 DISPOSAL OF OIL SPILL AT SEA
OTHER KEYWORDS: POLLUTANT ABSORPTION
- 3770627 CONTAINING AND REMOVING OIL SPILLS ON WATER
OTHER KEYWORDS: POLLUTANT COALESCENCE ; POLLUTANT, SURFACE BARRIER
- POLLUTANT COALESCENCE
- 3614873 FREEZING OIL SPILLS
OTHER KEYWORDS: POLLUTANT, MECHANICAL REMOVAL ;
POLLUTANT, SURFACE BARRIER
- 3635819 PROCESS FOR CLEANING UP OIL SPILLS
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, MECHANICAL REMOVAL
- 3755189 COMPOSITION FOR THE CONTROL OF OILS FLOATING ON WATER
- 3770627 CONTAINING AND REMOVING OIL SPILLS ON WATER
OTHER KEYWORDS: POLLUTANT BURNING ; POLLUTANT, SURFACE BARRIER
- POLLUTANT COLLECTION
- 3552424 FLOATING LIFT STATION
OTHER KEYWORDS: PIER, FLOATING ; SMALL-CRAFT SERVICE STRUCTURE
- 3554290 OIL POLLUTION CONTROL AND FIRE EXTINGUISHING APPARATUS AND METHOD
OTHER KEYWORDS: POLLUTANT BURNING ; POLLUTANT, SUCTION REMOVAL ;
POLLUTANT, SURFACE BARRIER
- 3557960 OIL SKIMMING APPARATUS
OTHER KEYWORDS: POLLUTANT REMOVAL WATERCRAFT .
POLLUTANT, SUCTION REMOVAL ; POLLUTANT, SURFACE BARRIER
- 3565254 APPARATUS FOR CONFINING A SLICK AND COLLECTING OIL THEREFROM
OTHER KEYWORDS: POLLUTANT, SUCTION REMOVAL ;
POLLUTANT, SURFACE BARRIER

- 3578171 APPARATUS FOR REMOVING FLOATING POLLUTANTS
OTHER KEYWORDS: POLLUTANT REMOVAL WATERCRAFT ;
POLLUTANT, SUCTION REMOVAL ; POLLUTANT, SURFACE
BARRIER
- 3581899 APPARATUS FOR SEPARATING OIL FROM WATER SURFACE
OTHER KEYWORDS: POLLUTANT ABSORPTION ; POLLUTANT, MECHANICAL REMOVAL ;
POLLUTANT REMOVAL WATERCRAFT
- 3584462 APPARATUS FOR GATHERING AND CLEANING WATER SURFACES OF POLLUTION
OTHER KEYWORDS: POLLUTANT DEEPSIS ; POLLUTANT, SURFACE BARRIER
- 3586469 PROCESS OF BURNING-OFF OIL ON THE SURFACE OF WATER BASINS
OTHER KEYWORDS: POLLUTANT REMOVAL WATERCRAFT ;
POLLUTANT, SURFACE BARRIER ; POLLUTANT BURNING
- 3590584 FLOATING OIL CONFINING APPARATUS
OTHER KEYWORDS: POLLUTANT, SUCTION REMOVAL ;
POLLUTANT, SURFACE BARRIER
- 3602299 OIL OR GAS POLLUTION CONTROL APPARATUS AND METHOD
OTHER KEYWORDS: POLLUTANT BURNING
- 3607741 OIL SLICK REMOVAL SYSTEM
OTHER KEYWORDS: POLLUTANT ABSORPTION ;
POLLUTANT, MECHANICAL REMOVAL
- 3612280 OIL-SKIMMING APPARATUS
OTHER KEYWORDS: POLLUTANT REMOVAL WATERCRAFT ;
POLLUTANT, SUCTION REMOVAL ; POLLUTANT, SURFACE
BARRIER
- 3613377 MULTICHAMBER FLOATING BARRIER
OTHER KEYWORDS: POLLUTANT, SURFACE BARRIER
- 3613891 OIL REMOVAL APPARATUS
OTHER KEYWORDS: POLLUTANT, MECHANICAL REMOVAL ;
POLLUTANT, SURFACE BARRIER
- 3628333 FLOATING CONTAMINANT CONSTRAINING FENCE
OTHER KEYWORDS: POLLUTANT, SURFACE BARRIER
- 3630376 OIL SLICK REMOVING VESSEL
OTHER KEYWORDS: POLLUTANT REMOVAL WATERCRAFT ;
POLLUTANT, SUCTION REMOVAL
- 3631679 APPARATUS TO CONFINE AND RECOVER OIL SPILLAGE AT SEA
OTHER KEYWORDS: POLLUTANT, SURFACE BARRIER
- 3635032 BOOM FOR OIL SPILT ON WATER
OTHER KEYWORDS: POLLUTANT, SURFACE BARRIER
- 3635342 METHOD AND APPARATUS FOR RECOVERING A SUBSTANCE FLOATING
AS A SHEET ON THE SURFACE OF A LIQUID MASS
OTHER KEYWORDS: POLLUTANT, SUCTION REMOVAL
- 3635819 PROCESS FOR CLEANING UP OIL SPILLS
OTHER KEYWORDS: POLLUTANT COALESCENCE ;
POLLUTANT, MECHANICAL REMOVAL
- 3648463 FLOATING BOOM FOR OIL-SOAKED MATERIAL
OTHER KEYWORDS: POLLUTANT, SURFACE BARRIER
- 3650406 OIL COLLECTION RETRIEVAL SYSTEM
OTHER KEYWORDS: POLLUTANT, SUCTION REMOVAL ;
POLLUTANT, SURFACE BARRIER

3653215 METHOD AND APPARATUS FOR CONFINING AND COLLECTING OIL LEAKAGE
OTHER KEYWORDS: POLLUTANT, SUBMERGED BARRIER

3653510 OIL SKIMMING METHOD AND APPARATUS
OTHER KEYWORDS: POLLUTANT REMOVAL WATERCRAFT ;
POLLUTANT, SUCTION REMOVAL ; POLLUTANT, SURFACE
BARRIER

3657119 POLLUTION CONTROL DEVICE
OTHER KEYWORDS: POLLUTANT ABSORPTION ; POLLUTANT, SURFACE BARRIER

3657895 OFFSHORE PLATFORM
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ;
OFFSHORE STORAGE TANK, EMERGENT ; POLLUTANT, SUBMERGED
BARRIER

3658181 UNDERWATER OIL LEAKAGE COLLECTING APPARATUS
OTHER KEYWORDS: POLLUTANT, SUBMERGED BARRIER

3661263 APPARATUS FOR SEPARATING AN OIL SLICK FROM A LARGE BODY OF WATER
OTHER KEYWORDS: POLLUTANT REMOVAL WATERCRAFT ;
POLLUTANT, SUCTION REMOVAL

3661264 LOG BOOM SYSTEM FOR SWEEPING OIL SLICKS FROM A LARGE BODY OF WATER
OTHER KEYWORDS: POLLUTANT REMOVAL WATERCRAFT

3662891 APPARATUS FOR CONFINING FLOATING MATERIALS
OTHER KEYWORDS: POLLUTANT, SURFACE BARRIER

3662892 IMMISCIBLE LIQUID SEPARATING APPARATUS
OTHER KEYWORDS: POLLUTANT REMOVAL WATERCRAFT

3664136 COLLECTING DEVICE FOR SUBMARINE OIL LEAKAGE
OTHER KEYWORDS: POLLUTANT, SUBMERGED BARRIER

3664429 APPARATUS FOR PREVENTING POLLUTION FROM OFFSHORE OIL WELLS
OTHER KEYWORDS: POLLUTANT BURNING

3664505 OIL COLLECTION DEVICE
OTHER KEYWORDS: POLLUTANT REMOVAL WATERCRAFT

3666098 METHOD AND APPARATUS FOR CONFINING AND COLLECTING AN OIL SLICK
OTHER KEYWORDS: POLLUTANT, SUCTION REMOVAL ; POLLUTANT, SURFACE BARRIER

3666100 METHOD AND APPARATUS FOR COLLECTING OIL FROM AN UNDERWATER LEAK
OTHER KEYWORDS: POLLUTANT, SUBMERGED BARRIER ; POLLUTANT, SUCTION REMOVAL

3667605 SUBMERGED OIL LEAK CONTROL
OTHER KEYWORDS: POLLUTANT, SUBMERGED BARRIER

3674150 APPARATUS FOR PREVENTING OFFSHORE OIL WELL POLLUTION
OTHER KEYWORDS: POLLUTANT, SUBMERGED BARRIER

3679058 OIL COLLECTION BOOM
OTHER KEYWORDS: POLLUTANT ABSORPTION ; POLLUTANT, MECHANICAL REMOVAL ;
POLLUTANT, SURFACE BARRIER

3681923 METHOD AND APPARATUS FOR CONTROLLING SUBSTRATE OIL SEEPAGE
OTHER KEYWORDS: POLLUTANT, SUBMERGED BARRIER

3684095 BARGE BASED SKIMMING SYSTEM FOR OIL SLICKS
OTHER KEYWORDS: POLLUTANT REMOVAL WATERCRAFT

3686870 ARRANGEMENT IN FLEXIBLE FENCES FOR ENCLOSING IMPURITIES FLOATING
ON WATER. OTHER KEYWORDS: POLLUTANT, SURFACE BARRIER

3688506 APPARATUS FOR REMOVING OIL SLICK FROM WATER SURFACES
OTHER KEYWORDS: POLLUTANT REMOVAL WATERCRAFT ;
POLLUTANT, SURFACE BARRIER

3700107 APPARATUS FOR RECOVERY OF FLOATING SUBSTANCES
OTHER KEYWORDS: POLLUTANT, MECHANICAL REMOVAL ;
POLLUTANT REMOVAL WATERCRAFT

3700108 OIL SKINNER
OTHER KEYWORDS: POLLUTANT DEBRIS ; POLLUTANT, MECHANICAL REMOVAL ;
POLLUTANT REMOVAL WATERCRAFT

3701430 OIL SKINNER
OTHER KEYWORDS: POLLUTANT DEBRIS ; POLLUTANT REMOVAL WATERCRAFT ;
POLLUTANT, SUCTION REMOVAL

3703084 BOOM SYSTEM FOR OIL CONTAINMENT
OTHER KEYWORDS: POLLUTANT, SURFACE BARRIER

3703464 TREATMENT OF OIL SPILLS
OTHER KEYWORDS: POLLUTANT ABSORPTION

3703811 OIL BOOM WITH CONTINUOUS CONDUIT THERE THROUGH
OTHER KEYWORDS: POLLUTANT, SURFACE BARRIER

3703960 MARINE SEWAGE COLLECTION AND DISCHARGE SYSTEMS
OTHER KEYWORDS: PUMP ; SMALL-CRAFT PIER ;
SMALL-CRAFT SERVICE STRUCTURE

3708070 OIL SKINNER
OTHER KEYWORDS: POLLUTANT REMOVAL WATERCRAFT ;
POLLUTANT, SUCTION REMOVAL

3710577 APPARATUS FOR CONFINING A FLOATABLE LIQUID
OTHER KEYWORDS: POLLUTANT, SURFACE BARRIER

3710943 VARIABLE DISPLACEMENT FENCE FOR OIL SPILL CONTAINMENT AND RECOVERY
OTHER KEYWORDS: POLLUTANT, SURFACE BARRIER

3716142 LIQUID SURFACE SWEEPING APPARATUS
OTHER KEYWORDS: POLLUTANT, SURFACE BARRIER

3720062 LIQUID CONFINING AND COLLECTING APPARATUS
OTHER KEYWORDS: POLLUTANT, SURFACE BARRIER

3724555 FLOATING FIRE EXTINGUISHING APPARATUS AND CATCH BASIN
OTHER KEYWORDS: POLLUTANT BURNING ; POLLUTANT REMOVAL WATERCRAFT ;
POLLUTANT, SUCTION REMOVAL

3726406 OIL SKINNING APPARATUS
OTHER KEYWORDS: POLLUTANT, SUCTION REMOVAL ;
POLLUTANT, SURFACE BARRIER

3730278 SAFETY ENCLOSURE FOR OFF-SHORE OIL RIGS
OTHER KEYWORDS: POLLUTANT BURNING ; POLLUTANT, SUCTION REMOVAL ;
POLLUTANT, SURFACE BARRIER

3730346 SKIMMING SYSTEM
OTHER KEYWORDS: POLLUTANT DEBRIS ; POLLUTANT, SUCTION REMOVAL

3734294 POLLUTANT RECOVERY SYSTEM
OTHER KEYWORDS: POLLUTANT ABSORPTION ; POLLUTANT, MECHANICAL REMOVAL ;
POLLUTANT REMOVAL WATERCRAFT

3745773 SAFETY OFF-SHORE DRILLING AND PUMPING PLATFORM
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ;
POLLUTANT, SUBMERGED BARRIER ; POLLUTANT, SUCTION REMOVAL

3747760 METHOD OF RECOVERING OIL FROM A WATER SURFACE
OTHER KEYWORDS: POLLUTANT, SUCTION REMOVAL

3752317 OIL RECOVERY VESSEL
OTHER KEYWORDS: POLLUTANT REMOVAL WATERCRAFT ;
POLLUTANT, SUCTION REMOVAL ; PUMP

3753497 POLLUTION SKIMMER
OTHER KEYWORDS: POLLUTANT, SUCTION REMOVAL

3754653 APPARATUS AND METHOD FOR COLLECTION OF OIL FROM SURFACE OF THE SEA
OTHER KEYWORDS: POLLUTANT REMOVAL WATERCRAFT ;
POLLUTANT, SUCTION REMOVAL

3756294 UNDERWATER LEAKAGE OIL COLLECTOR SYSTEM
OTHER KEYWORDS: POLLUTANT, SUBMERGED BARRIER

3757953 DECANTING SKIMMER
OTHER KEYWORDS: POLLUTANT, SUCTION REMOVAL

3762168 WATER POLLUTION CONTROL
OTHER KEYWORDS: CHANNEL BARRIER ; POLLUTANT, SURFACE BARRIER

3762169 FLOATING WATER JET FOR OIL SLICK CONTROL

3768656 OIL ACCUMULATOR
OTHER KEYWORDS: POLLUTANT, SURFACE BARRIER

3771662 OIL RECOVERY SYSTEM
OTHER KEYWORDS: POLLUTANT, SURFACE BARRIER

POLLUTANT DEBRIS

3584462 APPARATUS FOR GATHERING AND CLEANING WATER SURFACES OF POLLUTION
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SURFACE BARRIER

3592007 RETAINER FOR FLOATING DEBRIS
OTHER KEYWORDS: POLLUTANT, SURFACE BARRIER

3608727 APPARATUS FOR REMOVING OIL AND DEBRIS FROM WATER
OTHER KEYWORDS: POLLUTANT ABSORPTION ; POLLUTANT, MECHANICAL REMOVAL

3691773 WATER BARRIER FLOTATION CURTAIN
OTHER KEYWORDS: BREAKWATER, FLOATING ; POLLUTANT, SUBMERGED BARRIER ;
POLLUTANT, SURFACE BARRIER

3700108 OIL SKIMMER
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, MECHANICAL REMOVAL ;
POLLUTANT REMOVAL WATERCRAFT

3701430 OIL SKIMMER
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT REMOVAL WATERCRAFT ;
POLLUTANT, SUCTION REMOVAL

3730119 FLOATING DEBRIS RECOVERY BASKET
OTHER KEYWORDS: POLLUTANT REMOVAL WATERCRAFT

3730346 SKIMMING SYSTEM
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SUCTION REMOVAL

3731813 FLOATING DEBRIS RECOVERY APPARATUS
OTHER KEYWORDS: POLLUTANT, MECHANICAL REMOVAL ;
POLLUTANT REMOVAL WATERCRAFT ; POLLUTANT, SUCTION
REMOVAL

3732161 METHOD FOR REMOVING OIL AND DEBRIS FROM WATER
OTHER KEYWORDS: POLLUTANT ABSORPTION ; POLLUTANT, MECHANICAL REMOVAL

3762558 ANTI-POLLUTION BAGS AND CONVEYER ASSEMBLY
OTHER KEYWORDS: POLLUTANT, MECHANICAL REMOVAL ;
POLLUTANT REMOVAL WATERCRAFT

POLLUTANT DISPERSION

3561601 OIL SLICK DISPERSION APPARATUS
OTHER KEYWORDS: POLLUTANT REMOVAL WATERCRAFT

3577340 METHOD FOR DISPERSING OIL SPILLS ON WATER

3698850 PROMOTION OF BURNING OF OIL SLICKS WITH PARTICULATE,
FOAMED ALKALI METAL SILICATES. OTHER KEYWORDS: POLLUTANT BURNING ;
POLLUTANT ABSORPTION -

3700109 APPARATUS FOR REMOVING FLOATING LIQUIDS FROM THE SURFACE OF A
BODY OF WATER. OTHER KEYWORDS: POLLUTANT REMOVAL WATERCRAFT ;
POLLUTANT, SUCTION REMOVAL

POLLUTANT MEASUREMENT

3603952 SPILL SENSORS

3715913 AQUATIC SEDIMENT AND POLLUTION MONITOR
OTHER KEYWORDS: SAMPLER, SUSPENDED SEDIMENT ;
SEDIMENTATION MEASUREMENT

3728549 IN SITU DEVICE FOR MEASURING LIGHT SCATTERING
OTHER KEYWORDS: INSTRUMENT, LASER ; SAMPLER, SUSPENDED SEDIMENT

POLLUTANT REMOVAL WATERCRAFT

3557960 OIL SKIMMING APPARATUS
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SUCTION REMOVAL ;
POLLUTANT, SURFACE BARRIER

3561601 OIL SLICK DISPERSION APPARATUS
OTHER KEYWORDS: POLLUTANT DISPERSION

3576257 FLUID SEPARATION DEVICE
OTHER KEYWORDS: POLLUTANT, MECHANICAL REMOVAL

3578171 APPARATUS FOR REMOVING FLOATING POLLUTANTS
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SUCTION REMOVAL ;
POLLUTANT, SURFACE BARRIER

3581899 APPARATUS FOR SEPARATING OIL FROM WATER SURFACE
OTHER KEYWORDS: POLLUTANT ABSORPTION ; POLLUTANT COLLECTION ;
POLLUTANT, MECHANICAL REMOVAL

3586469 PROCESS OF BURNING-OFF OIL ON THE SURFACE OF WATER BASINS
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SURFACE BARRIER ;
POLLUTANT BURNING

3612280 OIL-SKIMMING APPARATUS
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SUCTION REMOVAL ;
POLLUTANT, SURFACE BARRIER

3615017 OIL ENTRAPMENT AND CONTAINMENT WATERCRAFT
OTHER KEYWORDS: POLLUTANT, SUCTION REMOVAL

3623609 SKIMMER FOR SEPARATING FLOWING LIQUIDS FROM WATER
OTHER KEYWORDS: POLLUTANT, MECHANICAL REMOVAL

3630376 OIL SLICK REMOVING VESSEL
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SUCTION REMOVAL

3637080 METHOD OF AND APPARATUS FOR SKIMMING FLOTSAM FROM THE SURFACE
OF A BODY OF WATER. OTHER KEYWORDS: POLLUTANT, MECHANICAL REMOVAL ;
WATER PLANT REMOVAL

3646901 WATERCRAFT ESPECIALLY USEFUL FOR THE RECOVERY OF OIL
OTHER KEYWORDS: POLLUTANT, MECHANICAL REMOVAL

3651243 POLLUTION SUCTION WATER SWEEPER
OTHER KEYWORDS: DREDGE, SUCTION ; POLLUTANT, SUCTION REMOVAL

3653510 OIL SKIMMING METHOD AND APPARATUS
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SUCTION REMOVAL ;
POLLUTANT, SURFACE BARRIER

3656619 APPARATUS AND METHOD FOR REMOVING FLOATING POLLUTANTS
FROM A BODY OF WATER. OTHER KEYWORDS: POLLUTANT, SUCTION REMOVAL

3656624 APPARATUS FOR COLLECTING WASTE FROM THE SURFACE OF A BODY OF WATER
OTHER KEYWORDS: POLLUTANT, MECHANICAL REMOVAL

3661263 APPARATUS FOR SEPARATING AN OIL SLICK FROM A LARGE BODY OF WATER
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SUCTION REMOVAL

3661264 LOG BOOM SYSTEM FOR SWEEPING OIL SLICKS FROM A LARGE BODY OF WATER
OTHER KEYWORDS: POLLUTANT COLLECTION

3662892 IMMISCIBLE LIQUID SEPARATING APPARATUS
OTHER KEYWORDS: POLLUTANT COLLECTION

3664505 OIL COLLECTION DEVICE
OTHER KEYWORDS: POLLUTANT COLLECTION

3670896 APPARATUS FOR REMOVING OIL FROM A BODY OF WATER
OTHER KEYWORDS: POLLUTANT, MECHANICAL REMOVAL

3684095 BARGE BASED SKIMMING SYSTEM FOR OIL SLICKS
OTHER KEYWORDS: POLLUTANT COLLECTION

3688506 APPARATUS FOR REMOVING OIL SLICK FROM WATER SURFACES
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SURFACE BARRIER

3690464 OIL RECOVERY VESSEL FOR THE REMOVAL OF OIL AND OTHER POLLUTING
MATTER FLOATING ON THE WATER SURFACE. OTHER KEYWORDS:
POLLUTANT, SUCTION REMOVAL ; PUMP

3695441 SELF-PROPELLED FLOATING DOCK AND SEPARATOR FILTER ASSEMBLY
FOR TREATING POLLUTED WATER SURFACES AND NAUTICAL WORKS

3700107 APPARATUS FOR RECOVERY OF FLOATING SUBSTANCES
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, MECHANICAL REMOVAL

3700108 OIL SKIMMER
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT DEBRIS ;
POLLUTANT, MECHANICAL REMOVAL

3700109 APPARATUS FOR REMOVING FLOATING LIQUIDS FROM THE SURFACE
OF A BODY OF WATER. OTHER KEYWORDS: POLLUTANT DISPERSION ;
POLLUTANT, SUCTION REMOVAL

3701430 OIL SKIMMER
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT DEBRIS ;
POLLUTANT, SUCTION REMOVAL

3704754 FLOATING OIL SKIMMER
OTHER KEYWORDS: POLLUTANT, SUCTION REMOVAL

3706185 APPARATUS FOR REMOVING MARINE GROWTHS AND ROOTS
OTHER KEYWORDS: POLLUTANT, MECHANICAL REMOVAL ; WATER PLANT REMOVAL

3708070 OIL SKIMMER
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SUCTION REMOVAL

3715034 DEVICE FOR REMOVING OIL SLICKS
OTHER KEYWORDS: POLLUTANT, SUCTION REMOVAL

3724555 FLOATING FIRE EXTINGUISHING APPARATUS AND CATCH BASIN
OTHER KEYWORDS: POLLUTANT BURNING ; POLLUTANT COLLECTION ;
POLLUTANT, SUCTION REMOVAL

3727766 VACUUM SKIMMING APPARATUS FOR REMOVING LIQUID CONTAMINANTS FLOATING
IN CONFINED BODIES OF WATER. OTHER KEYWORDS: POLLUTANT, SUCTION REMOVAL

3730119 FLOATING DEBRIS RECOVERY BASKET
OTHER KEYWORDS: POLLUTANT DEBRIS

3731813 FLOATING DEBRIS RECOVERY APPARATUS
OTHER KEYWORDS: POLLUTANT DEBRIS ; POLLUTANT, MECHANICAL REMOVAL ;
POLLUTANT, SUCTION REMOVAL

3734294 POLLUTANT RECOVERY SYSTEM
OTHER KEYWORDS: POLLUTANT ABSORPTION ; POLLUTANT COLLECTION ;
POLLUTANT, MECHANICAL REMOVAL

3737040 VESSEL FOR THE REMOVAL OF OIL ON WATER
OTHER KEYWORDS: POLLUTANT, SUCTION REMOVAL

3744257 WATER-SURFACE CLEANSING SHIP
OTHER KEYWORDS: POLLUTANT ABSORPTION ; POLLUTANT, MECHANICAL REMOVAL

3752317 OIL RECOVERY VESSEL
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SUCTION REMOVAL ;
PUMP

3754653 APPARATUS AND METHOD FOR COLLECTION OF OIL FROM SURFACE OF THE SEA
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SUCTION REMOVAL

3756414 OIL SKIMMER MODULE
OTHER KEYWORDS: POLLUTANT, SUCTION REMOVAL

3762558 ANTI-POLLUTION BARGE AND CONVEYER ASSEMBLY
OTHER KEYWORDS: POLLUTANT DEBRIS ; POLLUTANT, MECHANICAL REMOVAL
POLLUTANT, MECHANICAL REMOVAL

3576257 FLUID SEPARATION DEVICE
OTHER KEYWORDS: POLLUTANT REMOVAL WATERCRAFT

3578585 METHOD OF REMOVING FLOATING OIL FROM THE SURFACE OF A BODY OF WATER

3581899 APPARATUS FOR SEPARATING OIL FROM WATER SURFACE
OTHER KEYWORDS: POLLUTANT ABSORPTION ; POLLUTANT COLLECTION ;
POLLUTANT REMOVAL WATERCRAFT

3607741 OIL SLICK REMOVAL SYSTEM
OTHER KEYWORDS: POLLUTANT ABSORPTION ; POLLUTANT COLLECTION

3608727 APPARATUS FOR REMOVING OIL AND DEBRIS FROM WATER
OTHER KEYWORDS: POLLUTANT ABSORPTION ; POLLUTANT DEBRIS

3608728 OIL SKIMMER

3612277 METHOD OF RECOVERING OIL FROM AN OIL SLICK

3613891 OIL REMOVAL APPARATUS
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SURFACE BARRIER

3614875 FREEZING OIL SPILLS
OTHER KEYWORDS: POLLUTANT COALESCENCE ; POLLUTANT, SURFACE BARRIER

3617552 OIL-WATER SEPARATING PROCESS
OTHER KEYWORDS: POLLUTANT ABSORPTION

3617556 ERADICATING OIL SLICKS
OTHER KEYWORDS: POLLUTANT ABSORPTION

3618768 LIQUID SWEEPING SYSTEM EMPLOYING HELICAL CONVEYOR METHOD
AND APPARATUS

3623609 SKIMMER FOR SEPARATING FLOWING LIQUIDS FROM WATER
OTHER KEYWORDS: POLLUTANT REMOVAL WATERCRAFT

3630891 METHOD OF REMOVING OIL FROM THE SURFACE OF WATER
OTHER KEYWORDS: POLLUTANT ABSORPTION

3635819 PROCESS FOR CLEANING UP OIL SPILLS
OTHER KEYWORDS: POLLUTANT COALESCENCE ; POLLUTANT COLLECTION

3637080 METHOD OF AND APPARATUS FOR SKIMMING FLOTSAM FROM THE SURFACE
OF A BODY OF WATER-OTHER KEYWORDS: POLLUTANT REMOVAL WATERCRAFT ;
WATER PLANT REMOVAL

3646901 WATERCRAFT ESPECIALLY USEFUL FOR THE RECOVERY OF OIL
OTHER KEYWORDS: POLLUTANT, REMOVAL WATERCRAFT

3656624 APPARATUS FOR COLLECTING WASTE FROM THE SURFACE OF A BODY OF WATER
OTHER KEYWORDS: POLLUTANT REMOVAL WATERCRAFT

3666118 OIL HOP AND METHOD OF USING SAME
OTHER KEYWORDS: POLLUTANT ABSORPTION

3670896 APPARATUS FOR REMOVING OIL FROM A BODY OF WATER
OTHER KEYWORDS: POLLUTANT REMOVAL WATERCRAFT

3679058 OIL COLLECTION BOOM
OTHER KEYWORDS: POLLUTANT ABSORPTION ; POLLUTANT COLLECTION ;
POLLUTANT, SURFACE BARRIER

3700107 APPARATUS FOR RECOVERY OF FLOATING SUBSTANCES
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT REMOVAL WATERCRAFT

3700108 OIL SKIMMER
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT DEBRIS ;
POLLUTANT REMOVAL WATERCRAFT

3700593 APPARATUS AND METHOD FOR REMOVING OIL PRODUCTS FLOATING ON WATER
OTHER KEYWORDS: POLLUTANT ABSORPTION

3701258 BUOYANT PULLEY LOCATING AND ANCHORING DEVICE FOR AN OIL HOP
OTHER KEYWORDS: POLLUTANT ABSORPTION

- 3702297 OIL SKIMMING DEVICE AND METHOD
OTHER KEYWORDS: POLLUTANT ABSORPTION
- 3706185 APPARATUS FOR REMOVING MARINE GROWTHS AND ROOTS
OTHER KEYWORDS: POLLUTANT REMOVAL WATERCRAFT ; WATER PLANT REMOVAL
- 3731813 FLOATING DEBRIS RECOVERY APPARATUS
OTHER KEYWORDS: POLLUTANT DEBRIS ; POLLUTANT REMOVAL WATERCRAFT ;
POLLUTANT, SUCTION REMOVAL
- 3732161 METHOD FOR REMOVING OIL AND DEBRIS FROM WATER
OTHER KEYWORDS: POLLUTANT ABSORPTION ; POLLUTANT DEBRIS
- 3734294 POLLUTANT RECOVERY SYSTEM
OTHER KEYWORDS: POLLUTANT ABSORPTION ; POLLUTANT COLLECTION ;
POLLUTANT REMOVAL WATERCRAFT
- 3744257 WATER-SURFACE CLEANSING SHIP
OTHER KEYWORDS: POLLUTANT ABSORPTION ; POLLUTANT REMOVAL WATERCRAFT
- 3744638 OIL MOP AND METHOD OF USING SAME
OTHER KEYWORDS: POLLUTANT ABSORPTION
- 3762558 ANTI-POLLUTION BARGE AND CONVEYER ASSEMBLY
OTHER KEYWORDS: POLLUTANT DEBRIS ; POLLUTANT REMOVAL WATERCRAFT
- 3770626 SORPENT BELT
OTHER KEYWORDS: POLLUTANT ABSORPTION

POLLUTANT, SUBMERGED BARRIER

- 3561220 METHOD AND APPARATUS FOR CONTAINING WELL POLLUTANTS
OTHER KEYWORDS: OFFSHORE CAISSON
- 3599590 FLOATING OIL-RECOVERY SUMP
OTHER KEYWORDS: OFFSHORE STORAGE TANK, EMERGENT ;
POLLUTANT, SURFACE BARRIER
- 3635347 APPARATUS FOR CONTROLLING THE DISPERSION OF POLLUTANTS FLOATING
ON A BODY OF WATER. OTHER KEYWORDS: POLLUTANT, SURFACE BARRIER
- 3638796 APPARATUS FOR PREVENTING OIL POLLUTION
OTHER KEYWORDS: OFFSHORE CAISSON ; POLLUTANT, SURFACE BARRIER
- 3640073 BARRIER FOR DEFINING A SWIMMING AREA
OTHER KEYWORDS: POLLUTANT, SURFACE BARRIER
- 3653215 METHOD AND APPARATUS FOR CONFINING AND COLLECTING OIL LEAKAGE
OTHER KEYWORDS: POLLUTANT COLLECTION
- 3657895 OFFSHORE PLATFORM
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ;
OFFSHORE STORAGE TANK, EMERGENT ; POLLUTANT COLLECTION
- 3658181 UNDERWATER OIL LEAKAGE COLLECTING APPARATUS
OTHER KEYWORDS: POLLUTANT COLLECTION
- 3664136 COLLECTING DEVICE FOR SUBMARINE OIL LEAKAGE
OTHER KEYWORDS: POLLUTANT COLLECTION
- 3666100 METHOD AND APPARATUS FOR COLLECTING OIL FROM AN UNDERWATER LEAK
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SUCTION REMOVAL

3667605 SUBMERGED OIL LEAK CONTROL
OTHER KEYWORDS: POLLUTANT COLLECTION

3674150 APPARATUS FOR PREVENTING OFFSHORE OIL WELL POLLUTION
OTHER KEYWORDS: POLLUTANT COLLECTION

3681923 METHOD AND APPARATUS FOR CONTROLLING SUBNATANT OIL SEEPAGE
OTHER KEYWORDS: POLLUTANT COLLECTION

3691773 WATER BARRIER FLOTATION CURTAIN
OTHER KEYWORDS: BREAKWATER, FLOATING ; POLLUTANT DEBRIS ;
POLLUTANT, SURFACE BARRIER

3724662 CONTROL OF OIL POLLUTION AT SEA. APPARATUS AND METHOD
OTHER KEYWORDS: POLLUTANT, SUCTION REMOVAL

3745773 SAFETY OFF-SHORE DRILLING AND PUMPING PLATFORM
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ; POLLUTANT COLLECTION ;
POLLUTANT, SUCTION REMOVAL

3756294 UNDERWATER LEAKAGE OIL COLLECTOR SYSTEM
OTHER KEYWORDS: POLLUTANT COLLECTION

POLLUTANT, SUCTION REMOVAL

3554230 OIL POLLUTION CONTROL AND FIRE EXTINGUISHING APPARATUS AND METHOD
OTHER KEYWORDS: POLLUTANT BURNING ; POLLUTANT COLLECTION ;
POLLUTANT, SURFACE BARRIER

3556301 FLOATING FLEXIBLE SKIMMING DEVICES

3557960 OIL SKIMMING APPARATUS
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT REMOVAL WATERCRAFT ;
POLLUTANT, SURFACE BARRIER

3565254 APPARATUS FOR CONFINING A SLICK AND COLLECTING OIL THEREFROM
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SURFACE BARRIER

3567019 OIL LEAKAGE BARRIER
OTHER KEYWORDS: POLLUTANT, SURFACE BARRIER

3578171 APPARATUS FOR REMOVING FLOATING POLLUTANTS
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT REMOVAL WATERCRAFT ;
POLLUTANT, SURFACE BARRIER

3590584 FLOATING OIL CONFINING APPARATUS
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SURFACE BARRIER

3612280 OIL-SKIMMING APPARATUS
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT REMOVAL WATERCRAFT ;
POLLUTANT, SURFACE BARRIER

3615017 OIL ENTRAPMENT AND CONTAINMENT WATERCRAFT
OTHER KEYWORDS: POLLUTANT REMOVAL WATERCRAFT

3628665 FLOATING OIL CONTAINMENT APPARATUS
OTHER KEYWORDS: POLLUTANT, SURFACE BARRIER

3630376 OIL SLICK REMOVING VESSEL
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT REMOVAL WATERCRAFT

3635342 METHOD AND APPARATUS FOR RECOVERING A SUBSTANCE FLOATING AS A SHEET
ON THE SURFACE OF A LIQUID MASS. OTHER KEYWORDS: POLLUTANT COLLECTION

3642140 OIL RECOVERY AND CLEANUP SYSTEM

3650406 OIL COLLECTION RETRIEVAL SYSTEM
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SURFACE BARRIER

3651943 POLLUTION SUCTION WATER SWEEPER
OTHER KEYWORDS: DREDGE, SUCTION ; POLLUTANT REMOVAL WATERCRAFT

3653510 OIL SKIMMING METHOD AND APPARATUS
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT REMOVAL WATERCRAFT ;
POLLUTANT, SURFACE BARRIER

3656619 APPARATUS AND METHOD FOR REMOVING FLOATING POLLUTANTS
FROM A BODY OF WATER. OTHER KEYWORDS: POLLUTANT REMOVAL WATERCRAFT

3661263 APPARATUS FOR SEPARATING AN OIL SLICK FROM A LARGE BODY OF WATER
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT REMOVAL WATERCRAFT

3666098 METHOD AND APPARATUS FOR CONFINING AND COLLECTING AN OIL SLICK
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SURFACE BARRIER

3666100 METHOD AND APPARATUS FOR COLLECTING OIL FROM AN UNDERWATER LEAK
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SUBMERGED BARRIER

3669275 APPARATUS FOR REMOVING OIL FROM WATER
OTHER KEYWORDS: POLLUTANT ABSORPTION

3688909 FLOATING SELF ADJUSTING SKIMMER

3690463 FLOATING SUCTION HEAD

3690464 OIL RECOVERY VESSEL FOR THE REMOVAL OF OIL AND OTHER POLLUTING
MATTER FLOATING ON THE WATER SURFACE. OTHER KEYWORDS:
POLLUTANT REMOVAL WATERCRAFT ; PUMP

3700109 APPARATUS FOR REMOVING FLOATING LIQUIDS FROM THE SURFACE
OF A BODY OF WATER. OTHER KEYWORDS: POLLUTANT DISPERSION ;
POLLUTANT REMOVAL WATERCRAFT

3701429 SKIMMER FOR REMOVING FLOATING MATTER FROM A BODY OF LIQUID
OTHER KEYWORDS: PUMP

3701430 OIL SKIMMER
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT DEBRIS ;
POLLUTANT REMOVAL WATERCRAFT

3704784 FLOATING OIL SKIMMER
OTHER KEYWORDS: POLLUTANT REMOVAL WATERCRAFT

3706382 OIL REMOVAL DEVICE

3707232 SKIMMERS FOR POLLUTION CONTROL DEVICE

3708070 OIL SKIMMER
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT REMOVAL WATERCRAFT

3715034 DEVICE FOR REMOVING OIL SLICKS
OTHER KEYWORDS: POLLUTANT REMOVAL WATERCRAFT

3724555 FLOATING FIRE EXTINGUISHING APPARATUS AND CATCH BASIN
OTHER KEYWORDS: POLLUTANT BURNING ; POLLUTANT COLLECTION ;
POLLUTANT REMOVAL WATERCRAFT

3724662 CONTROL OF OIL POLLUTION AT SEA, APPARATUS AND METHOD
OTHER KEYWORDS: POLLUTANT, SUBMERGED BARRIER

3726406 OIL SKIMMING APPARATUS
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SURFACE BARRIER

3727766 VACUUM SKIMMING APPARATUS FOR REMOVING LIQUID CONTAMINANTS FLOATING
IN CONFINED BODIES OF WATER.OTHER KEYWORDS:
POLLUTANT REMOVAL WATERCRAFT

3730278 SAFETY ENCLOSURE FOR OFF-SHORE OIL RIGS
OTHER KEYWORDS: POLLUTANT BURNING ; POLLUTANT COLLECTION ;
POLLUTANT, SURFACE BARRIER

3730346 SKIMMING SYSTEM
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT DEBRIS

3731813 FLOATING DEBRIS RECOVERY APPARATUS
OTHER KEYWORDS: POLLUTANT DEBRIS ; POLLUTANT, MECHANICAL REMOVAL ;
POLLUTANT REMOVAL WATERCRAFT

3737040 VESSEL FOR THE REMOVAL OF OIL ON WATER
OTHER KEYWORDS: POLLUTANT REMOVAL WATERCRAFT

3741391 APPARATUS FOR ELIMINATING OIL SLICKS FROM LARGE BODIES OF WATER

3745115 METHOD AND APPARATUS FOR REMOVING AND RECLAIMING OIL SLICK FROM WATER

3745773 SAFETY OFF-SHORE DRILLING AND PUMPING PLATFORM
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ; POLLUTANT COLLECTION ;
POLLUTANT, SUBMERGED BARRIER

3747760 METHOD OF RECOVERING OIL FROM A WATER SURFACE
OTHER KEYWORDS: POLLUTANT COLLECTION

3752317 OIL RECOVERY VESSEL
OTHER KEYWORDS: POLLUTANT COLLECTION ;
POLLUTANT REMOVAL WATERCRAFT ; PUMP

3753496 CONVERGING VORTEX APPARATUS FOR SEPARATING OIL FROM WATER

3753497 POLLUTION SKIMMER
OTHER KEYWORDS: POLLUTANT COLLECTION

3754653 APPARATUS AND METHOD FOR COLLECTION OF OIL FROM SURFACE OF THE SEA
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT REMOVAL WATERCRAFT

3756414 OIL SKIMMER MODULE
OTHER KEYWORDS: POLLUTANT REMOVAL WATERCRAFT

3757953 DECANTING SKIMMER
OTHER KEYWORDS: POLLUTANT COLLECTION

3759390 THE REMOVAL OF SURFACE LAYERS FROM LIQUIDS

3762557 FLOATING SKIMMER
OTHER KEYWORDS: PUMP

3764015 APPARATUS FOR CONFINING FLOATING POLLUTANTS
OTHER KEYWORDS: POLLUTANT, SURFACE BARRIER

POLLUTANT, SURFACE BARRIER

3554290 OIL POLLUTION CONTROL AND FIRE EXTINGUISHING APPARATUS AND METHOD
OTHER KEYWORDS: POLLUTANT BURNING ; POLLUTANT COLLECTION ;
POLLUTANT, SUCTION REMOVAL

3557960 OIL SKIMMING APPARATUS
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT REMOVAL WATERCRAFT ;
POLLUTANT, SUCTION REMOVAL

3563036 INFLATABLE FLOATING BOOMS
 3564652 FLEXIBLE FLOATING BOOMS
 3565254 APPARATUS FOR CONFINING A SLICK AND COLLECTING OIL THEREFROM
 OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SUCTION REMOVAL
 3565257 FLOATING BARRIER FOR WATER POLLUTANTS
 OTHER KEYWORDS: POLLUTANT ABSORPTION
 3567019 OIL LEAKAGE BARRIER
 OTHER KEYWORDS: POLLUTANT, SUCTION REMOVAL
 3576108 MARINE OIL BOOM
 3577879 FLOATING BARRIER MEANS
 3578171 APPARATUS FOR REMOVING FLOATING POLLUTANTS
 OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT REMOVAL WATERCRAFT ;
 POLLUTANT, SUCTION REMOVAL
 3579994 BARRIER FOR CONTROL OF SUBSTANCES IN BODIES OF WATER
 3584462 APPARATUS FOR GATHERING AND CLEANING WATER SURFACES OF POLLUTION
 OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT DEBRIS
 3586469 PROCESS OF BURNING-OFF OIL ON THE SURFACE OF WATER BASINS
 OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT REMOVAL WATERCRAFT ;
 POLLUTANT BURNING
 3590584 FLOATING OIL CONFINING APPARATUS
 OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SUCTION REMOVAL
 3592005 OIL BARRIER FOR OFFSHORE OIL RIGS
 3592006 ISOLATION DEVICE
 3592007 RETAINER FOR FLOATING DEBRIS
 OTHER KEYWORDS: POLLUTANT DEBRIS
 3592008 FLOTATION CONFINEMENT APPARATUS
 3593526 APPARATUS AND METHODS FOR OIL SLICK CONTAINMENT
 3597924 FLOATING OIL BARRIER AND METHOD OF CONTAINING A FLOATING SUBSTANCE
 3599434 DEVICE FOR CONFINING OIL RELEASED BY LEAKAGE
 DURING OFFSHORE OIL DRILLING OPERATIONS
 3599590 FLOATING OIL-RECOVERY SUMP
 OTHER KEYWORDS: OFFSHORE STORAGE TANK, EMERGENT ;
 POLLUTANT, SUBMERGED BARRIER
 3608316 BUOYANT BARRIER AND METHOD FOR INSTALLING THE SAME
 3611728 STRUCTURE FOR CONFINING AND STORING FLOATING LIQUID PRODUCTS
 3612280 OIL-SKIMMING APPARATUS
 OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT REMOVAL WATERCRAFT ;
 POLLUTANT, SUCTION REMOVAL
 3613376 FENCE FOR ENCLOSING IMPURITIES FLOATING ON WATER
 3613377 MULTICHAMBER FLOATING BARRIER
 OTHER KEYWORDS: POLLUTANT COLLECTION

3613891 OIL REMOVAL APPARATUS
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, MECHANICAL REMOVAL

3614873 FREEZING OIL SPILLS
OTHER KEYWORDS: POLLUTANT COALESCENCE ; POLLUTANT, MECHANICAL REMOVAL

3617565 METHOD AND MEANS FOR THE ABSORPTION OF PETROLEUM PRODUCTS
OTHER KEYWORDS: POLLUTANT ABSORPTION

3617566 METHOD AND MATERIAL FOR SEPARATING OIL FROM OIL-CONTAINING WATER
OTHER KEYWORDS: POLLUTANT ABSORPTION

3628333 FLOATING CONTAMINANT CONSTRAINING FENCE
OTHER KEYWORDS: POLLUTANT COLLECTION

3628665 FLOATING OIL CONTAINMENT APPARATUS
OTHER KEYWORDS: POLLUTANT, SUCTION REMOVAL

3630033 APPARATUS FOR CONTROLLING OIL SLICKS

3631679 APPARATUS TO CONFINE AND RECOVER OIL SPILLAGE AT SEA
OTHER KEYWORDS: POLLUTANT COLLECTION

3631984 METHOD AND DEVICE FOR SEPARATION OF LIQUIDS

3635032 BOOM FOR OIL SPILT ON WATER
OTHER KEYWORDS: POLLUTANT COLLECTION

3635347 APPARATUS FOR CONTROLLING THE DISPERSION OF POLLUTANTS FLOATING
ON A BODY OF WATER. OTHER KEYWORDS: POLLUTANT, SUBMERGED BARRIER

3638429 APPARATUS FOR CONFINING MATERIAL FLOATING ON WATER

3638430 HIGH-STRENGTH FIRE-RESISTANT SPILL CONTROL BOOMS

3638796 APPARATUS FOR PREVENTING OIL POLLUTION
OTHER KEYWORDS: OFFSHORE CAISSON ; POLLUTANT, SUBMERGED BARRIER

3640073 BARRIER FOR DEFINING A SWIMMING AREA
OTHER KEYWORDS: POLLUTANT, SUBMERGED BARRIER

3641770 FLOATING OIL CONFINING APPARATUS

3641771 APPARATUS AND METHOD FOR CONFINING AND COLLECTING OIL FLOATING
ON A WATER SURFACE

3645099 BUOYANT SLICK RETAINING STRUCTURE

3648463 FLOATING BOOM FOR OIL-SOAKED MATERIAL
OTHER KEYWORDS: POLLUTANT COLLECTION

3650406 OIL COLLECTION RETRIEVAL SYSTEM
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SUCTION REMOVAL

3651646 PNEUMATIC BARRIER SYSTEM FOR WATER SURFACES

3651647 OIL SLICK CONFINEMENT EQUIPMENT

3653213 PLASTIC OIL BARRIER

3653214 OIL FILM CONTAINMENT APPARATUS

3653510 OIL SKIMMING METHOD AND APPARATUS
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT REMOVAL WATERCRAFT ;
POLLUTANT, SUCTION REMOVAL

3657119 POLLUTION CONTROL DEVICE
OTHER KEYWORDS: POLLUTANT ABSORPTION ; POLLUTANT COLLECTION

3662891 APPARATUS FOR CONFINING FLOATING MATERIALS
 OTHER KEYWORDS: POLLUTANT COLLECTION

3664504 METHOD AND APPARATUS FOR DEPLOYING A FLOATABLE BARRIER

3665713 CONTAMINANT CONTAINMENT METHOD AND APPARATUS

3666098 METHOD AND APPARATUS FOR CONFINING AND COLLECTING AN OIL SLICK
 OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SUCTION REMOVAL

3667235 CONVERTIBLE BARRIER FOR SUBSTANCES FLOATING ON WATER

3673804 OFF-SHORE PIPE AND POLLUTION CONTROL SYSTEM

3679058 OIL COLLECTION BOOM
 OTHER KEYWORDS: POLLUTANT ABSORPTION ; POLLUTANT COLLECTION ;
 POLLUTANT, MECHANICAL REMOVAL

3685296 ELASTOMERIC OIL SLICK BOOM

3685297 APPARATUS FOR CONFINING FLOATING MATERIALS

3686669 BUOYANT BARRIER AND METHOD FOR INSTALLING THE SAME

3686870 ARRANGEMENT IN FLEXIBLE FENCES FOR ENCLOSING IMPURITIES FLOATING
 ON WATER. OTHER KEYWORDS: POLLUTANT COLLECTION

3688506 APPARATUS FOR REMOVING OIL SLICK FROM WATER SURFACES
 OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT REMOVAL WATERCRAFT

3691773 WATER BARRIER FLOTATION CURTAIN
 OTHER KEYWORDS: BREAKWATER, FLOATING ; POLLUTANT DEBRIS ;
 POLLUTANT, SUBMERGED BARRIER

3695042 SURFACE OIL CONTAINMENT DEVICE

3701259 OIL POLLUTION BARRIER

3702657 POLLUTION CONTAINMENT BARRIER
 OTHER KEYWORDS: POLLUTANT ABSORPTION

3703084 BOOM SYSTEM FOR OIL CONTAINMENT
 OTHER KEYWORDS: POLLUTANT COLLECTION

3703811 OIL BOOM WITH CONTINUOUS CONDUIT THERE THROUGH
 OTHER KEYWORDS: POLLUTANT COLLECTION

3708982 SYSTEM AND BARRIER FOR CONTAINING AN OIL SPILL

3708983 APPARATUS FOR CONFINING OIL SPILLS
 OTHER KEYWORDS: PIER, FIXED

3710577 APPARATUS FOR CONFINING A FLOATABLE LIQUID
 OTHER KEYWORDS: POLLUTANT COLLECTION

3710943 VARIABLE DISPLACEMENT FENCE FOR OIL SPILL CONTAINMENT AND RECOVERY
 OTHER KEYWORDS: POLLUTANT COLLECTION

3713410 FLOATING BARRAGE

3716142 LIQUID SURFACE SWEEPING APPARATUS
 OTHER KEYWORDS: POLLUTANT COLLECTION

3718001 WAVE RIDING WATER BARRIER

3720062 LIQUID CONFINING AND COLLECTING APPARATUS
 OTHER KEYWORDS: POLLUTANT COLLECTION

3726406 OIL SKIMMING APPARATUS
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SUCTION REMOVAL

3730278 SAFETY ENCLOSURE FOR OFF-SHORE OIL RIGS
OTHER KEYWORDS: POLLUTANT BURNING ; POLLUTANT COLLECTION ;
POLLUTANT, SUCTION REMOVAL

3731491 OIL CONTAINMENT BOOM

3739564 FLOATING BARRIER FOR CIRCUMSCRIBING OIL POOLS OR LIKE REFUSE

3739913 DEVICE FOR FENCING AND ABSORBING CONTAMINATING OIL SPILLS ON WATER
OTHER KEYWORDS: POLLUTANT ABSORPTION

3740955 FLEXIBLE OIL BOOM FOR HIGH SEA

3741173 OIL SPILL BOOM

3744254 PROCESS AND APPARATUS FOR CONTAINMENT OF AQUEOUS POLLUTANTS

3751925 FLOATING OIL CONTAINMENT BOOM

3756031 SELF-RIGHTING FLOATING BOOMS

3757526 FLOATING BOOM STRUCTURES

3762168 WATER POLLUTION CONTROL
OTHER KEYWORDS: CHANNEL BARRIER ; POLLUTANT COLLECTION

3764015 APPARATUS FOR CONFINING FLOATING POLLUTANTS
OTHER KEYWORDS: POLLUTANT, SUCTION REMOVAL

3766738 APPARATUS

3766739 OIL SPILLAGE ENCLOSURE SYSTEM FOR MARINE USE
OTHER KEYWORDS: PIER FENDER

3768656 OIL ACCUMULATOR
OTHER KEYWORDS: POLLUTANT COLLECTION

3770627 CONTAINING AND REMOVING OIL SPILLS ON WATER
OTHER KEYWORDS: POLLUTANT BURNING ; POLLUTANT COALESCENCE

3771662 OIL RECOVERY SYSTEM
OTHER KEYWORDS: POLLUTANT COLLECTION

3775982 ANTI-POLLUTION BARRIER

3779020 IMMERSIBLE OIL FENCE ASSEMBLY

RE27452 FLOATING BOOMS
OTHER KEYWORDS: BREAKWATER, FLOATING ; GROIN ;
LOW-COST SHORE PROTECTION

RE27640 INFLATABLE FLOAT BOOM

POWER, TIDE

3567953 TIDE-OPERATED POWER PLANT
OTHER KEYWORDS: ELECTRICAL GENERATOR

3668412 APPARATUS FOR HARNESSING THE VERTICAL MOVEMENT OF OCEAN TIDES
AND UTILIZE THE FORCE FOR GENERATING ELECTRICAL ENERGY
OTHER KEYWORDS: ELECTRICAL GENERATOR

3690790 TIDE-POWERED UNIT AND FLOATING PLATFORM UTILIZING SAME
OTHER KEYWORDS: OFFSHORE PLATFORM ANCHOR ;
OFFSHORE PLATFORM, FLOATING ; PUMP

3706507 TIDE-ACTUATED MACHINE

3746875 ELECTRICAL POWER PLANT DRIVEN BY OCEAN WAVES AND TIDES
OTHER KEYWORDS: ELECTRICAL GENERATOR ; OFFSHORE PLATFORM, FIXED ;
POWER, WAVE

POWER, WAVE

3569723 WAVE-ACTUATED POWER GENERATOR-BUOY
OTHER KEYWORDS: BUOY, INSTRUMENTED ; ELECTRICAL GENERATOR ;
INSTRUMENT POWER SUPPLY ; PUMP

3595189 WAVE-ACTUATED LOAD COMPENSATOR
OTHER KEYWORDS: PUMP

3598505 BELLOWS PUMP
OTHER KEYWORDS: PUMP ; SAMPLER, WATER

3609604 WAVE OPERATED POWER APPARATUS
OTHER KEYWORDS: ELECTRICAL GENERATOR ; PUMP

3631670 DEVICE TO EXTRACT POWER FROM THE OSCILLATION OF THE SEA

3664125 OFFSHORE POWER CONVERSION APPARATUS
OTHER KEYWORDS: ELECTRICAL GENERATOR

3685231 POLLUTION FREE ELECTRIC POWER AND WATER PRODUCING STATION
UTILIZING THE KINETIC AND POTENTIAL ENERGY OF WATER WIND WAVES
OTHER KEYWORDS: ELECTRICAL GENERATOR

3691573 SELF-POWERED SIGNAL BUOY
OTHER KEYWORDS: BUOY, INSTRUMENTED ; ELECTRICAL GENERATOR

3697764 METHOD AND APPARATUS FOR GENERATING ELECTRICITY
OTHER KEYWORDS: ELECTRICAL GENERATOR

3746875 ELECTRICAL POWER PLANT DRIVEN BY OCEAN WAVES AND TIDES
OTHER KEYWORDS: ELECTRICAL GENERATOR ; OFFSHORE PLATFORM, FIXED ;
POWER, TIDE

3758788 CONVERSION SYSTEM FOR PROVIDING USEFUL ENERGY FROM WATER SURFACE MOTION
OTHER KEYWORDS: PUMP

3774048 ENERGY GENERATING AND STORING ASSEMBLY FOR MARINE STRUCTURE
OTHER KEYWORDS: ELECTRICAL GENERATOR

3777494 WAVE ENERGY MOTORS

PUMP

3563607 SUBAQUEOUS MINING
OTHER KEYWORDS: DREDGE, SUCTION ; DREDGE INTAKE

3565491 JET PUMP METHOD AND SYSTEM
OTHER KEYWORDS: CHANNEL PROTECTION ; DREDGE-SPOIL MEASUREMENT ;
DREDGE-SPOIL TRANSPORT ; DREDGE, SUCTION ; TIDAL INLET

3569725 WAVE-ACTUATED POWER GENERATOR-BUOY
OTHER KEYWORDS: BUOY, INSTRUMENTED ; ELECTRICAL GENERATOR ;
INSTRUMENT POWER SUPPLY ; POWER, WAVE

3595189 WAVE-ACTUATED LOAD COMPENSATOR
OTHER KEYWORDS: POWER, WAVE

3598505 BELLOWS PUMP
OTHER KEYWORDS: POWER, WAVE ; SAMPLER, WATER

- 3603804 WAVE OPERATED POWER APPARATUS
OTHER KEYWORDS: ELECTRICAL GENERATOR ; POWER, WAVE
- 3624933 DREDGING PLANT APPARATUS COMBINING PUMPING AND DIGGING ACTION
OTHER KEYWORDS: DREDGE, SUCTION ; DREDGE INTAKE
- 3673716 CONTINUOUSLY OPERATED APPARATUS FOR RAISING UNDERWATER DEPOSITS
OTHER KEYWORDS: DREDGE CUTTER, HEAD ; DREDGE INTAKE
- 3681862 SUCTION DREDGER HAVING PLURAL PUMPS AND PLURAL ARTICULATED
PIPE SECTIONS OTHER KEYWORDS: DREDGE, SUCTION ; DREDGE INTAKE ;
DREDGE LADDER CONTROL
- 3686887 SCOUR CONTROL SYSTEM FOR SUBMERGED STRUCTURES
OTHER KEYWORDS: OFFSHORE PLATFORM, LEG ; SEABED SCOUR PROTECTION
- 3690464 OIL RECOVERY VESSEL FOR THE REMOVAL OF OIL
AND OTHER POLLUTING MATTER FLOATING ON THE WATER SURFACE
OTHER KEYWORDS: POLLUTANT REMOVAL WATERCRAFT ;
POLLUTANT, SUCTION REMOVAL
- 3690790 TIDE-POWERED UNIT AND FLOATING PLATFORM UTILIZING SAME
OTHER KEYWORDS: OFFSHORE PLATFORM ANCHOR ;
OFFSHORE PLATFORM, FLOATING ; POWER, TIDE
- 3693271 FLOATING POWER FOR UNDERWATER DREDGING
OTHER KEYWORDS: DREDGE, SUCTION ; DREDGE-SPOIL TRANSPORT ;
OFFSHORE PLATFORM, FLOATING
- 3701429 SKIMMER FOR REMOVING FLOATING MATTER FROM A BODY OF LIQUID
OTHER KEYWORDS: POLLUTANT, SUCTION REMOVAL
- 3703960 MARINE SEWAGE COLLECTION AND DISCHARGE SYSTEMS
OTHER KEYWORDS: POLLUTANT COLLECTION ; SMALL-CRAFT PIER ;
SMALL-CRAFT SERVICE STRUCTURE
- 3752317 OIL RECOVERY VESSEL
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT REMOVAL WATERCRAFT ;
POLLUTANT, SUCTION REMOVAL
- 3755932 JACK UP DREDGE
OTHER KEYWORDS: DREDGE, CUTTERHEAD ; DREDGE LADDER CONTROL ;
DREDGE PROPULSION ; DREDGE, SUBMERGED
- 3758788 CONVERSION SYSTEM FOR PROVIDING USEFUL ENERGY FROM WATER
SURFACE MOTION. OTHER KEYWORDS: POWER, WAVE
- 3762557 FLOATING SKIMMER
OTHER KEYWORDS: POLLUTANT, SUCTION REMOVAL
- 3763580 APPARATUS FOR DREDGING IN DEEP OCEAN
OTHER KEYWORDS: DREDGE, CUTTERHEAD ; DREDGE LADDER CONTROL
- 3774323 COMPOSITE BUCKET-HYDRAULIC DREDGE
OTHER KEYWORDS: DREDGE, SUCTION ; DREDGE INTAKE ;
DREDGE LADDER CONTROL ; SEABED GRADER
- 3777376 ARTICULATED LADDER CONSTRUCTION FOR CUTTERHEAD DREDGE
OTHER KEYWORDS: DREDGE, CUTTERHEAD ; DREDGE LADDER CONTROL
- REVETMENT
- 3770254 METHOD AND MEANS FOR PROTECTING AN EARTH SURFACE AGAINST SCOUR
OTHER KEYWORDS: CONCRETE FORM ; FABRIC MAT ;
LOW-COST SHORE PROTECTION ; SLOPE PROTECTION

3597928 EROSION CONTROL
OTHER KEYWORDS: CONCRETE BLOCK ; FABRIC MAT ;
LOW-COST SHORE PROTECTION ; SLOPE PROTECTION

3602111 PAVING BLOCKS
OTHER KEYWORDS: CONCRETE BLOCK ; LOW-COST SHORE PROTECTION

3635033 BITUMINOUS COMPOSITIONS IN HYDRAULIC CONSTRUCTIONS
OTHER KEYWORDS: ASPHALT ; SPEAKWATER, RUBBLE ; GRouting

SALINITY MEASUREMENT

3652433 APPARATUS FOR MEASURING IN HIGH-PRESSURE ENVIRONMENTS

3748899 CONDUCTIVITY AND TEMPERATURE SENSING PROBE
OTHER KEYWORDS: BATHYTHERMOGRAPH ; INSTRUMENT DEPLOYMENT

SAMPLER, BIOTA

3683699 METHOD OF RETRIEVING MARINE LIFE AND MINERAL SPECIMENS
FROM OCEAN'S DEEPEST PARTS. OTHER KEYWORDS:
INSTRUMENT DEPLOYMENT ; SAMPLER, SEABED GRAB

3729855 APPARATUS FOR SEQUENTIALLY DEPLOYING SPECIMEN COLLECTORS
AT SELECTED DEPTHS IN A BODY OF WATER. OTHER KEYWORDS:
INSTRUMENT DEPLOYMENT ; INSTRUMENT, TOWED

SAMPLER, POWER SUPPLY

3561547 PONTON SAMPLER
OTHER KEYWORDS: SAMPLER, SEABED-DRIVEN CORE

3664438 UNDERWATER ROCK CORE SAMPLING DEVICE AND METHOD OF USE THEREOF
OTHER KEYWORDS: SAMPLER, SEABED-DRILLED CORE

3701387 CORE SAMPLING APPARATUS
OTHER KEYWORDS: INSTRUMENT DEPLOYMENT ; INSTRUMENT RETRIEVAL ;
SAMPLER, SEABED-DRIVEN CORE

3741320 SUBSEA DRILLING ASSEMBLY
OTHER KEYWORDS: SAMPLER, SEABED-DRILLED CORE

RE27292 APPARATUS FOR SUBMARINE CORE DRILLING
OTHER KEYWORDS: INSTRUMENT DEPLOYMENT ; SAMPLER, SEABED-DRILLED CORE

SAMPLER, SEABED-DRILLED CORE

3602320 DEEP SEA PILE SETTING AND CORING VESSEL
OTHER KEYWORDS: EMBEDMENT ANCHOR

3631932 OFFSHORE DRILLING APPARATUS AND METHOD

3664438 UNDERWATER ROCK CORE SAMPLING DEVICE AND METHOD OF USE THEREOF
OTHER KEYWORDS: SAMPLER, POWER SUPPLY

3707196 SEDIMENT SAMPLE RETRIEVER
OTHER KEYWORDS: INSTRUMENT RETRIEVAL ; SAMPLER, SEABED-DRIVEN CORE

3741320 SUBSEA DRILLING ASSEMBLY
OTHER KEYWORDS: SAMPLER, POWER SUPPLY

RE27292 APPARATUS FOR SUBMARINE CORE DRILLING
OTHER KEYWORDS: INSTRUMENT DEPLOYMENT ; SAMPLER, POWER SUPPLY

SAMPLER, SEABED-DRIVEN CORE

- 3561546 METHOD OF AND APPARATUS FOR UNDERWATER GEOCHEMICAL EXPLORATION
OTHER KEYWORDS: SAMPLER, WATER
- 3561547 BOTTOM SAMPLER
OTHER KEYWORDS: SAMPLER, POWER SUPPLY
- 3576220 TELESCOPING SEA FLOOR SOIL SAMPLER
- 3608651 APPARATUS FOR DRIVING ELONGATED ELEMENTS INTO UNDERWATER GROUNDS
OTHER KEYWORDS: EMBEDEDMENT ANCHOR ; OFFSHORE CONSTRUCTION ;
PILE DRIVER, VIBRATORY ; PILE PLACEMENT
- 3613446 SELF-RECORDING ACCELEROMETER
OTHER KEYWORDS: INSTRUMENT POWER SUPPLY ;
INSTRUMENT, SEABED IN SITU ; SEABED PROPERTY MEASUREMENT
- 3647009 FLUKED CORE RETAINER
- 3667553 TELESCOPING SEA FLOOR SOIL SAMPLER
- 3693730 VIBRATORY DEVICE FOR TAKING BOTTOM SEDIMENTS CORES
OTHER KEYWORDS: INSTRUMENT DEPLOYMENT
- 3701387 CORE SAMPLING APPARATUS
OTHER KEYWORDS: INSTRUMENT DEPLOYMENT ; INSTRUMENT RETRIEVAL ;
SAMPLER, POWER SUPPLY
- 3707196 SEDIMENT SAMPLE RETRIEVER
OTHER KEYWORDS: INSTRUMENT RETRIEVAL ; SAMPLER, SEABED-DRILLED CORE
- 3714996 UNDERSEA COPING MACHINE WITH MEANS FOR SEPARATING SAMPLES
OTHER KEYWORDS: INSTRUMENT DEPLOYMENT

SAMPLER, SEABED GRAB

- 3572129 FREE, FALL BOTTOM SAMPLER
- 3593533 UNDERWATER COLLECTING AND LIFTING DEVICE
OTHER KEYWORDS: INSTRUMENT DEPLOYMENT
- 3683699 METHOD OF RETRIEVING MARINE LIFE AND MINERAL SPECIMENS
FROM OCEAN'S DEEPEST PARTS-OTHER KEYWORDS:
INSTRUMENT DEPLOYMENT ; SAMPLER, BIOTA
- 3762078 BENTHIC DREDGE CONSTRUCTION
OTHER KEYWORDS: DREDGE, MECHANICAL
- 3777377 METHOD OF COLLECTING SUBMARINE RESOURCES
OTHER KEYWORDS: DREDGE, MECHANICAL

SAMPLER, SUSPENDED SEDIMENT

- 3715913 AQUATIC SEDIMENT AND POLLUTION MONITOR
OTHER KEYWORDS: POLLUTANT MEASUREMENT ; SEDIMENTATION MEASUREMENT
- 3728549 IN SITU DEVICE FOR MEASURING LIGHT SCATTERING
OTHER KEYWORDS: INSTRUMENT, LASER ; POLLUTANT MEASUREMENT

SAMPLER, WATER

- 3561546 METHOD OF AND APPARATUS FOR UNDERWATER GEOCHEMICAL EXPLORATION
OTHER KEYWORDS: SAMPLER, SEABED-DRIVEN CORE
- 3598505 BELLOWS PUMP
OTHER KEYWORDS: POWER, WAVE ; PUMP

3610037 SEA WATER CESIUM SAMPLER

3623369 WATER-SAMPLING DEVICE

3625066 WATER SAMPLING APPARATUS

3714830 WATER SAMPLING DEVICE

3769842 SUBMERSIBLE SAMPLER

SANDBAG

3662559 ANCHORAGE FOR BOAT DOCKS

OTHER KEYWORDS: PIER, FLOATING ; PILE FOOTING ; SEABED FOUNDATION ;
SMALL-CRAFT PIER

SEABED CABLE PLOW

3638439 EMBEDDING CABLELIKE MEMBERS

OTHER KEYWORDS: SEABED TRENCHER

3641780 TRENCHLESS LAYING OF PIPE UNDERGROUND

OTHER KEYWORDS: SEABED PIPELINE PLACEMENT

3688511 METHOD OF AND APPARATUS FOR FLUSH-JET EMBEDDING STRUCTURAL ELEMENTS
AND FOR SUCKING OFF GROUND MATERIAL. OTHER KEYWORDS:

SEABED PIPELINE PLACEMENT ; SEABED TRENCHER

SEABED FOUNDATION

3555831 COMPOSITE FOUNDATION MEMBER AND METHOD

OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE, STRUCTURE CONNECTION

3564856 PROCESS AND APPARATUS FOR CEMENTING OFFSHORE SUPPORT MEMBERS

OTHER KEYWORDS: GROUTING ; OFFSHORE CONSTRUCTION ;
OFFSHORE PLATFORM, LEG ; PILE, STRUCTURE CONNECTION

3575005 METHOD AND APPARATUS FOR OFFSHORE OPERATIONS

OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, JACK UP ;
PILE PLACEMENT

3589133 METHOD OF AND MEANS FOR MOUNTING EQUIPMENT AT A SUBSEA LOCATION

OTHER KEYWORDS: SEABED OIL PROCESS STRUCTURE

3592012 LATERALLY REINFORCED OFFSHORE PLATFORM

OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ; PILE PLACEMENT

3592013 TILTING JACK OFFSHORE PLATFORM

OTHER KEYWORDS: OFFSHORE PLATFORM, JACK UP

3593530 MARINE PLATFORM WITH REMOVAL COLUMN CLAMPS

OTHER KEYWORDS: OFFSHORE PLATFORM, JACK UP ; PILE, STRUCTURE CONNECTION

3605414 SUBMERGED WELL HEAD PLATFORM

OTHER KEYWORDS: SEABED OIL, PROCESS STRUCTURE

3608320 METHOD AND APPARATUS FOR CONSTRUCTING A CONCRETE WALL STRUCTURE

IN OPEN WATER. OTHER KEYWORDS: CONCRETE FORM ; OFFSHORE CAISSON ;
OFFSHORE CONSTRUCTION ; PILE DRIVER, WATER JET ; PILE-DRIVING SHOE

3630161 MULTIPLE PURPOSE FLOATING CONCRETE RING

OTHER KEYWORDS: OFFSHORE PLATFORM ANCHOR , OFFSHORE PLATFORM, FIXED ;
OFFSHORE STORAGE TANK, EMERGENT ; OFFSHORE STRUCTURE FENDER

3638436 REVERSED SLOPE SKIRT PILE MARINE PLATFORM ANCHORING

OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ; PILE PLACEMENT

3645104 TOWER STRUCTURE
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ;
OFFSHORE STORAGE TANK, EMERGENT

3646770 METHOD AND APPARATUS FOR STABILIZING AN OFFSHORE DRILLING
PLATFORM STRUCTURE. OTHER KEYWORDS: PILE, CONCRETE ;
PILE, STEEL ; SEABED SOIL TREATMENT

3653218 HYDRAULIC CONSTRUCTION AND METHOD FOR BUILDING SAME
OTHER KEYWORDS: SPOUTING ; OFFSHORE PLATFORM, FIXED ;
OFFSHORE PLATFORM, LEG ; PIER, FIXED ; PILE DOLEPHIN

3662559 ANCHORAGE FOR BOAT DOCKS
OTHER KEYWORDS: PIER, FLOATING ; PILE FOOTING ; SANDBAG ;
SMALL-CRAFT PIER

3665718 METHOD OF FILLING A SPACE UNDER A STRUCTURAL ELEMENT
AND STRUCTURE THEREFOR OTHER KEYWORDS: SEABED MATERIAL PLACEMENT

3665720 METHOD OF STABILIZING SAND FOUNDATIONS UNDER BUILDING WORKS
SUBMERGED IN WATER
OTHER KEYWORDS: SEABED SOIL TREATMENT

3668876 OFFSHORE TOWER APPARATUS AND METHOD
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED

3672177 SUBSEA FOUNDATION UNIT AND METHOD OF INSTALLATION
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE PLACEMENT ;
SEABED OIL, PROCESS STRUCTURE

3677113 METHOD AND APPARATUS FOR FORMING A FOUNDATION-LEG ASSEMBLY
FOR AN OFFSHORE PLATFORM. OTHER KEYWORDS: OFFSHORE CONSTRUCTION ;
OFFSHORE PLATFORM, LEG ; PILE, CONCRETE ; PILE FOOTING ; PILE, STEEL

3683632 METHOD OF LAYING A FOUNDATION FOR A STRUCTURAL ELEMENT UNDER WATER
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; SEABED MATERIAL PLACEMENT

3686811 SPACED MULTI-WALL CONSTRUCTION UNIT
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED ;
OFFSHORE STORAGE TANK, SUBMERGED

3686876 REMOVABLE PIER CONSTRUCTION
OTHER KEYWORDS: PIER, FIXED ; PIER, MOBILE ; SMALL-CRAFT PIER

3693361 METHOD AND APPARATUS FOR TRANSPORTING AND LAUNCHING
AN OFFSHORE TOWER. OTHER KEYWORDS: OFFSHORE CONSTRUCTION ;
OFFSHORE PLATFORM, FIXED

3693363 EQUIPMENT FOR MOVING STEP BY STEP A STRUCTURE CARRYING OUT
OPERATIONS SUPPORTED ON A SEA-BED OR THE LIKE
OTHER KEYWORDS: OFFSHORE PLATFORM, LEG ; OFFSHORE PLATFORM, WALKING

3695047 UNDERWATER LIQUID STORAGE FACILITY
OTHER KEYWORDS: OFFSHORE STORAGE TANK, SUBMERGED

3698198 DEEP-WATER DRILLING, PRODUCTION AND STORAGE SYSTEM
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED ;
OFFSHORE STORAGE TANK, EMERGENT

3703207 SUBSEA PUNKER CONSTRUCTION
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; SEABED OIL, PROCESS STRUCTURE

3704435 CAISSON FOR SEAWORKS CONSTRUCTION AND TO A METHOD OF USING THE CAISSON
OTHER KEYWORDS: GROUTING ; OFFSHORE CAISSON ;
OFFSHORE CONSTRUCTION ; SEABED MATERIAL PLACEMENT

3706205 APPARATUS AND METHOD OF MAKING AN UNDERWATER CONNECTION
BETWEEN A STRUCTURAL MEMBER AND A SUPPORTING PILE
OTHER KEYWORDS: GROUTING ; OFFSHORE CAISSON ;
PILE, STRUCTURE CONNECTION

3708987 CONCRETE REINFORCEMENT FOR UNDERWATER USE
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ;
OFFSHORE STORAGE TANK, SUBMERGED

3716943 MODULAR OFFSHORE STRUCTURES SYSTEM
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ; OFFSHORE PLATFORM, JACK UP ;
OFFSHORE PLATFORM, LEG

3716994 ASSEMBLY SYSTEM FOR A DETACHABLY CONNECTED OFFSHORE MARINE STRUCTURE
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, JACK UP

3726667 METHOD FOR BUILDING IMMERSED STRUCTURES AND A DEVICE
FOR CARRYING OUT SAID METHOD. OTHER KEYWORDS: CHANNEL BARRIER ;
GROUTING ; OFFSHORE CONSTRUCTION ; PILE, SHEET ; PILE, STEEL

3729940 OFFSHORE TOWER
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED

3736631 METHOD AND APPARATUS FOR PREVENTING EROSION AND FOR CONVEYING
OTHER KEYWORDS: BREAKWATER, CONCRETE ; WAVE ABSORBER BEACH

3738115 METHOD AND APPARATUS FOR PLASTIC HYDRAULIC MATERIAL
OTHER KEYWORDS: CONCRETE FORM ; OFFSHORE CAISSON ;
OFFSHORE CONSTRUCTION ; SEABED MATERIAL PLACEMENT

3745775 UNDERWATER IN SITU PLACEMENT OF CONCRETE
OTHER KEYWORDS: CONCRETE FORM ; SEABED MATERIAL PLACEMENT

3751330 ARTICULATED MARINE STRUCTURE WITH PREPOSITIONED ANCHORING PILES
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED ;
PILE DRIVER LEADS ; PILE PLACEMENT

3754403 OFFSHORE MARINE STRUCTURE EMBODYING ANCHOR PILE MEANS
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED ;
PILE DRIVER LEADS ; PILE PLACEMENT

3763656 PLACING OFFSHORE SUPPORTING ELEMENTS
OTHER KEYWORDS: EMBEDMENT ANCHOR ; OFFSHORE CONSTRUCTION ;
PILE DRIVER, WATER JET ; PILE FOOTING ; SEABED SOIL TREATMENT

3766583 OFFSHORE LIQUEFIED GAS TERMINAL
OTHER KEYWORDS: OFFSHORE STORAGE TANK, EMERGENT

3769803 SUBMERGED STORAGE VESSEL
OTHER KEYWORDS: OFFSHORE STORAGE TANK, EMERGENT

3777497 STORAGE TANK FOR OFFSHORE STORAGE OF LIQUID AND METHOD
OF CONSTRUCTING AND INSTALLING SAME. OTHER KEYWORDS:
OFFSHORE STORAGE TANK, EMERGENT

3779024 STATIONARY STORAGE AND MOORING PLANT RESTING ON THE BOTTOM
OF THE SEA. OTHER KEYWORDS: BREAKWATER, CONCRETE ; OFFSHORE CAISSON ;
OFFSHORE HARBOR ; OFFSHORE STORAGE TANK, EMERGENT ; PIER, FIXED

RE27308 UNDERWATER LOW TEMPERATURE SEPARATION UNIT
OTHER KEYWORDS: SEABED OIL, PROCESS STRUCTURE

SEABED GRADER

- 3566454 APPARATUS FOR WORKING UNDER WATER
OTHER KEYWORDS: OFFSHORE PLATFORM, FLOATING
- 3629963 APPARATUS FOR LEVELLING UNDERWATER GROUND
- 3633530 FLOATING DEVICE FOR SUBMARINE WORKING VEHICLES
- 3757438 BULLDOZER FOR UNDERWATER OPERATIONS
- 3774323 COMPOSITE BUCKET-HYDRAULIC DREDGE
OTHER KEYWORDS: DREDGE, SUCTION ; DREDGE INTAKE ;
DREDGE LADDER CONTROL ; PUMP

SEABED MATERIAL PLACEMENT

- 3572042 PROCESS FOR FORMING A PLASTIC FILL SHEET ON OCEAN FLOOR SILT
OTHER KEYWORDS: SEABED SOIL TREATMENT
- 3577736 APPARATUS FOR INJECTING SAND BENEATH SUBMERGED CONSTRUCTIONS
OTHER KEYWORDS: OFFSHORE CONSTRUCTION
- 3625014 METHOD AND APPARATUS FOR UNDERWATER DEPOSITION OF SETTABLE MATERIALS
OTHER KEYWORDS: ASPHALT ; CONCRETE FORM ; SLOPE PROTECTION
- 3642464 METHOD AND MEANS FOR PLACING ARTIFICIAL SEAWEED
OTHER KEYWORDS: ARTIFICIAL SEAWEED ; EMBEDMENT ANCHOR
- 3664781 SILT STABILIZATION DEVICE
OTHER KEYWORDS: SEABED SOIL TREATMENT
- 3665718 METHOD OF FILLING A SPACE UNDER A STRUCTURAL ELEMENT
AND STRUCTURE THEREFOR OTHER KEYWORDS: SEABED FOUNDATION
- 3683632 METHOD OF LAYING A FOUNDATION FOR A STRUCTURAL ELEMENT UNDER WATER
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; SEABED FOUNDATION
- 3688510 SUBMARINE ROCK PLACING TRAVELEP
OTHER KEYWORDS: SEABED PIPELINE PLACEMENT ; SEABED SCOUR PROTECTION
- 3704595 CAISSON FOR SEAWORKS CONSTRUCTION AND TO A METHOD
OF USING THE CAISSON. OTHER KEYWORDS: GROUTING ; OFFSHORE CAISSON ;
OFFSHORE CONSTRUCTION ; SEABED FOUNDATION
- 3738115 METHOD AND APPARATUS FOR PLASTIC HYDRAULIC MATERIAL
OTHER KEYWORDS: CONCRETE FORM ; OFFSHORE CAISSON ;
OFFSHORE CONSTRUCTION ; SEABED FOUNDATION
- 3745775 UNDERWATER IN SITU PLACEMENT OF CONCRETE
OTHER KEYWORDS: CONCRETE FORM ; SEABED FOUNDATION
- 3773027 METHOD AND APPARATUS FOR A CONTINUOUS DUMBBELL TUBE ANCHORING SYSTEM
FOR SUBMARINE PIPELINES. OTHER KEYWORDS: CONCRETE FORM ; FABRIC MAT ;
SEABED PIPELINE PLACEMENT ; SEABED SCOUR PROTECTION

SEABED OIL, PROCESS STRUCTURE

- 3556210 DEEP SEA WELL DRILLING STRUCTURE
OTHER KEYWORDS: OFFSHORE CAISSON ; OFFSHORE CONSTRUCTION
- 3572044 MULTIUNIT OFFSHORE PLATFORM
OTHER KEYWORDS: OFFSHORE PLATFORM, JACK UP
- 3589133 METHOD OF AND MEANS FOR MOUNTING EQUIPMENT AT A SUBSEA LOCATION
OTHER KEYWORDS: SEABED FOUNDATION

- 3605414 SUBMERGED WELL HEAD PLATFORM
OTHER KEYWORDS: SEABED FOUNDATION
- 3672177 SUBSEA FOUNDATION UNIT AND METHOD OF INSTALLATION
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE PLACEMENT ;
SEABED FOUNDATION
- 3703207 SUBSEA PUNKER CONSTRUCTION
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; SEABED FOUNDATION
- RE27308 UNDERWATER LOW TEMPERATURE SEPARATION UNIT
OTHER KEYWORDS: SEALED FOUNDATION

SEABED PIPELINE PLACEMENT

- 3576111 UNDERWATER PIPELINE, BURYING APPARATUS
OTHER KEYWORDS: SEABED TRENCHER
- 3583170 SUBMERGED PIPELINE ENTRENCHING APPARATUS AND CONTROL SYSTEMS
FOR SAME-OTHER KEYWORDS: SEABED TRENCHER
- 3590589 APPARATUS FOR BURYING PIPELINES
OTHER KEYWORDS: SEABED TRENCHER
- 3641780 TRENCHLESS LAYING OF PIPE UNDERGROUND
OTHER KEYWORDS: SEABED CABLE PLOW
- 3662560 VALVE GUARD AND BURYING METHOD AND APPARATUS
OTHER KEYWORDS: SEABED TRENCHER
- 3664142 METHOD OF BURYING AN OBJECT IN THE SOIL
OTHER KEYWORDS: SEABED SOIL TREATMENT ; SEABED TRENCHER
- 3670514 AUTOMATIC SUBMARINE TRENCHER
OTHER KEYWORDS: SEABED TRENCHER
- 3673808 METHOD OF AND APPARATUS FOR BURYING SUB-SEA PIPELINES, CABLES
AND THE LIKE-OTHER KEYWORDS: SEABED TRENCHER
- 3688510 SUBMARINE ROCK PLACING TRAVELER
OTHER KEYWORDS: SEABED MATERIAL PLACEMENT ; SEABED SCOUR PROTECTION
- 3688511 METHOD OF AND APPARATUS FOR FLUSH-JET EMBEDDING STRUCTURAL ELEMENTS
AND FOR SUCKING OFF GROUND MATERIAL-OTHER KEYWORDS:
SEABED CABLE PLOW ; SEABED TRENCHER
- 3695049 METHOD AND APPARATUS FOR BURYING A PIPELINE
HAVING FIXED FLUIDIZATION MEANS-OTHER KEYWORDS: SEABED TRENCHER
- 3702540 APPARATUS AND METHOD FOR BURYING PIPELINE
OTHER KEYWORDS: SEABED TRENCHER
- 3717003 TRENCHING APPARATUS
OTHER KEYWORDS: SEABED TRENCHER
- 3729942 RAPID CONSOLIDATION OF FLUIDIZED SAND BED
OTHER KEYWORDS: SEABED SOIL TREATMENT
- 3732700 UNDERWATER PIPELINE AND CABLE TRENCHING APPARATUS
OTHER KEYWORDS: SEABED TRENCHER
- 3732701 UNDERWATER PIPELINE TRENCHING APPARATUS
OTHER KEYWORDS: DREDGE, CUTTERHEAD ; DREDGE INTAKE ; SEABED TRENCHER
- 3751927 APPARATUS FOR ENTRENCHING SUBMERGED ELONGATE STRUCTURES
OTHER KEYWORDS: DREDGE, CUTTERHEAD ; SEABED TRENCHER

3765184 DEVICE AND METHOD FOR THE ATTACHMENT OF PIPELINES
TO AN UNDERWATER SURFACE. OTHER KEYWORDS: EMBEDMENT ANCHOR

3779027 METHOD AND APPARATUS FOR A CONTINUOUS DUMBBELL TUBE ANCHORING SYSTEM
FOR SUBMARINE PIPELINES. OTHER KEYWORDS: CONCRETE FORM ; FABRIC MAT ;
SEABED MATERIAL PLACEMENT ; SEABED SCOUR PROTECTION

SEABED PROPERTY MEASUREMENT

3613446 SELF-RECORDING ACCELEROMETER
OTHER KEYWORDS: INSTRUMENT POWER SUPPLY ; INSTRUMENT, SEABED IN SITU ;
SAMPLER, SEABED-DRIVEN CORE

3645018 METHOD AND APPARATUS FOR EXCLUDING SILT FROM A DREDGING OPERATION
OTHER KEYWORDS: DREDGE, SUCTION ; DREDGE INTAKE

3728622 METHOD OF AND APPARATUS FOR MEASURING IN SITU THE FORMATION FACTOR
OTHER KEYWORDS: INSTRUMENT DEPLOYMENT ; INSTRUMENT, SEABED IN SITU ;
INSTRUMENT, TOWED

3757287 SEA BOTTOM CLASSIFIER
OTHER KEYWORDS: SONAR, DEPTH SOUNDER

SEABED SCOUR PROTECTION

3559407 ARTIFICIAL SEAWEEED
OTHER KEYWORDS: ARTIFICIAL SEAWEEED

3561219 TEXTILE MAT FOR INDUSTRIAL USE IN THE FIELD OF CIVIL ENGINEERING
OTHER KEYWORDS: FABRIC MAT ; SLOPE PROTECTION

3563037 MINIMIZING SCOURING ACTION IN WATER FLOW CHANNELS
OTHER KEYWORDS: FABRIC MAT ; SLOPE PROTECTION

3617996 SCOUR DETECTION AT BRIDGE PIERS AND THE LIKE
OTHER KEYWORDS: SONAR, DEPTH SOUNDER ; SEDIMENTATION MEASUREMENT

3686887 SCOUR CONTROL SYSTEM FOR SUBMERGED STRUCTURES
OTHER KEYWORDS: OFFSHORE PLATFORM, LEG ; PUMP

3688510 SUBMARINE ROCK PLACING TRAVELER
OTHER KEYWORDS: SEABED MATERIAL PLACEMENT ; SEABED PIPELINE PLACEMENT

3699686 BOTTOM AND BANK FACING MATTRESS
OTHER KEYWORDS: FABRIC MAT ; SLOPE PROTECTION

3779027 METHOD AND APPARATUS FOR A CONTINUOUS DUMBBELL TUBE ANCHORING
SYSTEM FOR SUBMARINE PIPELINES. OTHER KEYWORDS: CONCRETE FORM ;
FABRIC MAT ; SEABED MATERIAL PLACEMENT ; SEABED PIPELINE PLACEMENT

SEABED SITE SURVEY

3562917 APPARATUS FOR MEASURING IRREGULAR SURFACES OF DEPOSITS
OF CONCRETE BLOCKS OR RUBBLE MOUNDS. OTHER KEYWORDS:
BREAKWATER, RUBBLE ; CONCRETE ARMOR UNIT ; STRUCTURE INSPECTION

3680216 METHOD OF MEASURING THE RELATIVE DEPTH BETWEEN TWO
OR MORE UNDERWATER LOCATIONS

3781775 ROTATING STEREO SONAR MAPPING AND POSITIONING SYSTEM
OTHER KEYWORDS: INSTRUMENT DEPLOYMENT ; SONAR, SIDE LOOKING

SEABED SOIL TREATMENT

3572042 PROCESS FOR FORMING A PLASTIC FILL SHEET ON OCEAN FLOOR SILT
OTHER KEYWORDS: SEABED MATERIAL PLACEMENT

- 3611732 METHOD FOR STABILIZING SILT
- 3646770 METHOD AND APPARATUS FOR STABILIZING AN OFFSHORE DRILLING
PLATFORM STRUCTURE.OTHER KEYWORDS: PILE,CONCRETE ; PILE,STEEL ;
SEABED FOUNDATION
- 3664142 METHOD OF BURYING AN OBJECT IN THE SOIL
OTHER KEYWORDS: SEABED PIPELINE PLACEMENT ; SEABED TRENCHER
- 3664781 SOIL STABILIZATION DEVICE
OTHER KEYWORDS: SEABED MATERIAL PLACEMENT
- 3665720 METHOD OF STABILIZING SAND FOUNDATIONS UNDER BUILDING WORKS
SUBMERGED IN WATER.OTHER KEYWORDS: SEABED FOUNDATION
- 3729942 RAPID CONSOLIDATION OF FLUIDIZED SAND BED
OTHER KEYWORDS: SEABED PIPELINE PLACEMENT
- 3763656 PLACING OFFSHORE SUPPORTING ELEMENTS
OTHER KEYWORDS: EMBEDMENT ANCHOR ; OFFSHORE CONSTRUCTION ;
PILE DRIVER,WATER JET ; PILE FOOTING ; SEABED FOUNDATION

SEABED TRENCHER

- 3576111 UNDERWATER PIPELINE-BURYING APPARATUS
OTHER KEYWORDS: SEABED PIPELINE PLACEMENT
- 3583170 SUBMERGED PIPELINE ENTRENCHING APPARATUS AND CONTROL SYSTEMS FOR SAME
OTHER KEYWORDS: SEABED PIPELINE PLACEMENT
- 3590589 APPARATUS FOR BURYING PIPELINES
OTHER KEYWORDS: SEABED PIPELINE PLACEMENT
- 3618236 APPARATUS FOR DIGGING AN UNDERWATER TRENCH
- 3638338 APPARATUS AND METHOD FOR DEEP SEA DREDGING
OTHER KEYWORDS: DREDGE,CUTTERHEAD ; DREDGE LADDER CONTROL
- 3638439 EMBEDDING CABLELIKE MEMBERS
OTHER KEYWORDS: SEABED CABLE PLOW
- 3662560 VALVE GUARD AND BURYING METHOD AND APPARATUS
OTHER KEYWORDS: SEABED PIPELINE PLACEMENT
- 3664142 METHOD OF BURYING AN OBJECT IN THE SOIL
OTHER KEYWORDS: SEABED PIPELINE PLACEMENT ; SEABED SOIL TREATMENT
- 3670514 AUTOMATIC SUBMARINE TRENCHER
OTHER KEYWORDS: SEABED PIPELINE PLACEMENT
- 3673808 METHOD OF AND APPARATUS FOR BURYING SUB-SEA PIPELINES, CABLES
AND THE LIKE.OTHER KEYWORDS: SEABED PIPELINE PLACEMENT
- 3688511 METHOD OF AND APPARATUS FOR FLUSH-JET EMBEDDING STRUCTURAL ELEMENTS
AND FOR SUCKING OFF GROUND MATERIAL.OTHER KEYWORDS:
SEABED CABLE PLOW ; SEABED PIPELINE PLACEMENT
- 3695049 METHOD AND APPARATUS FOR BURYING A PIPELINE
HAVING FIXED FLUIDIZATION MEANS.OTHER KEYWORDS:
SEABED PIPELINE PLACEMENT
- 3702540 APPARATUS AND METHOD FOR BURYING PIPELINE
OTHER KEYWORDS: SEABED PIPELINE PLACEMENT
- 3706142 SUBMARINE DREDGING APPARATUS
OTHER KEYWORDS: DREDGE,CUTTERHEAD ; DREDGE PROPULSION ;
DREDGE, SUBMERGED

3717003 TRENCHING APPARATUS
OTHER KEYWORDS: SEABED PIPELINE PLACEMENT

3732700 UNDERWATER PIPELINE AND CABLE TRENCHING APPARATUS
OTHER KEYWORDS: SEABED PIPELINE PLACEMENT

3732701 UNDERWATER PIPELINE TRENCHING APPARATUS
OTHER KEYWORDS: DREDGE, CUTTERHEAD ; DREDGE INTAKE ;
SEABED PIPELINE PLACEMENT

3741119 REMOTE ROCK BREAKING METHOD APPARATUS THEREFOR

3751927 APPARATUS FOR ENTRENCHING SUBMERGED ELONGATE STRUCTURES
OTHER KEYWORDS: DREDGE, CUTTERHEAD ; SEABED PIPELINE PLACEMENT

SEABED WATER, PROCESS STRUCTURE

3572506 UNDERWATER STORAGE TANK
OTHER KEYWORDS: OFFSHORE STORAGE TANK SUBMERGED

SEAWALL

3613382 SEA WALL CONSTRUCTION
OTHER KEYWORDS: CONCRETE BLOCK ; OFFSHORE CONSTRUCTION ; PILE, STEEL

3640075 METHOD OF INSTALLING BREAKWATER CAISSONS
OTHER KEYWORDS: BREAKWATER, CONCRETE ; OFFSHORE CAISSON ;
OFFSHORE CONSTRUCTION

3712069 BEACH PROTECTION SYSTEM

3757527 WAVE DEFLECTING DEVICE FOR A SEA WALL
OTHER KEYWORDS: PILE, SHEET ; PILE, STEEL

3768266 SHORELINE CONSTRUCTION FOR ARTIFICIAL WATER BODIES

SEDIMENTATION MEASUREMENT

3617996 SCOUR DETECTION AT BRIDGE PIERS AND THE LIKE
OTHER KEYWORDS: SEABED SCOUR PROTECTION ; SONAR, DEPTH SOUNDER

3697756 DEVICE FOR INSERTING TAGGED SAND INTO OCEAN FLOOR
OTHER KEYWORDS: INSTRUMENT DEPLOYMENT ; INSTRUMENT, RADIOISOTOPE

3700602 METHOD FOR MASS TAGGING SAND WITH A RADIOACTIVE ISOTOPE
OTHER KEYWORDS: INSTRUMENT, RADIOISOTOPE

3715913 AQUATIC SEDIMENT AND POLLUTION MONITOR
OTHER KEYWORDS: POLLUTANT MEASUREMENT ; SAMPLER, SUSPENDED SEDIMENT

SEISMIC ACOUSTIC TRANSMITTER ARRAY

3602878 METHOD AND APPARATUS FOR GENERATING ENHANCED ACOUSTIC WAVES
OTHER KEYWORDS: SEISMIC EXPLOSIVE ACOUSTIC TRANSMITTER ;
SEISMIC SURVEY METHOD

3613823 DOUBLE-BUBBLE SPARK ARRAY
OTHER KEYWORDS: SEISMIC EXPLOSIVE ACOUSTIC TRANSMITTER

SEISMIC EXPLOSIVE ACOUSTIC TRANSMITTER

3563334 SEISMIC SOURCE FOR USE WHILE SUBMERGED IN A LIQUID MEDIUM

3572462 APPARATUS FOR AND METHOD OF SEISMIC EXPLORATION
OTHER KEYWORDS: SEISMIC HYDROPHONE ; SEISMIC SURVEY METHOD

3574298 FIRING DEVICE, METHOD, AND SYSTEM, FOR SEISMIC EXPLORATION
 3578101 CHARGE LOADER DEVICE, SYSTEM, AND METHOD
 FOR UNDERWATER SEISMIC EXPLORATION, OTHER KEYWORDS:
 SEISMIC SURVEY METHOD
 3592286 METHOD OF SEISMIC PROSPECTING
 3601052 UNDERWATER CHARGE LAUNCHER
 3601217 AIR-OPERATED SEISMIC GAS EXPLODERS
 3602878 METHOD AND APPARATUS FOR GENERATING ENHANCED ACOUSTIC WAVES
 OTHER KEYWORDS: SEISMIC ACOUSTIC TRANSMITTER ARRAY ;
 SEISMIC SURVEY METHOD
 3603426 APPARATUS FOR MARINE SEISMOGRAPHIC PROSPECTING
 OTHER KEYWORDS: TOWED BODY DEPTH CONTROL
 3610357 SEISMIC SOUND SOURCE
 3610366 SYSTEM FOR MARINE SEISMIC EXPLORATION
 OTHER KEYWORDS: SEISMIC IMPLOSIVE ACOUSTIC TRANSMITTER
 3613823 DOUBLE-BUBBLE SPARK ARRAY
 OTHER KEYWORDS: SEISMIC ACOUSTIC TRANSMITTER ARRAY
 3613824 PNEUMATIC ACOUSTIC SOURCE EMPLOYING ELECTROMAGNETICALLY
 CONTROLLED VALVE
 3653460 SEISMIC ENERGY WAVESHAPE CONTROL APPARATUS AND METHOD
 3670840 FLEXIBLE SEISMIC GAS EXPLODER
 3702984 UNDERWATER CARTRIDGE DETECTOR
 3718206 AMPHIBIOUS SEISMIC EXPLORATION VEHICLE AND METHOD
 OTHER KEYWORDS: SEISMIC SURVEY METHOD ;
 SEISMIC VIBRATORY ACOUSTIC TRANSMITTER
 3724590 BUBBLE PULSE SUPPRESSION WITH ACOUSTIC SOURCE OPTIMIZATION
 3728671 MULTIPLE-ELECTRODE, DIRECTIONAL, ACOUSTIC SOURCE
 3730289 SEISMOGRAPHIC DEVICE
 3740708 SEISMIC PNEUMATIC ENERGY SOURCE WITH BUBBLE ELIMINATOR
 AND SIGNAL OSCILLATION ATTENUATOR
 3744018 METHOD OF AND APPARATUS FOR PRODUCING A REPETITIVE SEISMIC IMPULSE
 3744020 MARINE SEISMIC SOURCE
 OTHER KEYWORDS: TOWED VEHICLE
 3746123 METHOD OF AND SYSTEM FOR REDUCING SECONDARY PRESSURE PULSES
 IN OPERATION OF PNEUMATIC SOUND SOURCE IN WATER
 OTHER KEYWORDS: TOWED VEHICLE
 3750097 COMPRESSED GAS SEISMIC ENERGY GENERATOR
 3750837 EXPLOSIVE SEISMIC ENERGY SOURCE WITH QUICK RELEASE VALVE
 SEISMIC HYDRAULIC ACOUSTIC TRANSMITTER
 3684050 METHOD AND APPARATUS FOR ACOUSTIC ENERGY GENERATION
 IN MARINE EXPLORATION

3690403 ACOUSTIC ENERGY SOURCE UTILIZING THE WATER-HAMMER PHENOMENON

3711824 METHOD OF PRODUCING UNDERWATER SEISMIC WAVES AND APPARATUS THEREFOR

3718207 METHOD AND APPARATUS FOR PROVIDING UNDERWATER SEISMIC ENERGY SIGNALS

SEISMIC HYDROPHONE

3572462 APPARATUS FOR AND METHOD OF SEISMIC EXPLORATION
OTHER KEYWORDS: SEISMIC EXPLOSIVE ACOUSTIC TRANSMITTER ,
SEISMIC SURVEY METHOD

3659257 CONTINUOUS MAGNETIC LINE HYDROPHONE
OTHER KEYWORDS: SEISMIC STREAMER CABLE

3675193 HOOP STRESSED BEAM HYDROPHONE
OTHER KEYWORDS: SEISMIC STREAMER CABLE

3689875 FLEXIBLE GEOPHONE
OTHER KEYWORDS: SEISMIC STREAMER CABLE

3701088 DEMAND SONOBUOY
OTHER KEYWORDS: BUOY, INSTRUMENTED

3739326 HYDROPHONE ASSEMBLY

3775707 DEVICES FOR SENSING PRESSURE IN A LIQUID MEDIUM
OTHER KEYWORDS: SEISMIC STREAMER CABLE

SEISMIC HYDROPHONE ARRAY

3581273 MARINE SEISMIC EXPLORATION
OTHER KEYWORDS: SEISMIC SURVEY METHOD

3613071 SIMULTANEOUS DUAL SEISMIC SPREAD CONFIGURATION FOR DETERMINING DATA
PROCESSING OF EXTENSIVE SEISMIC DATA.OTHER KEYWORDS:
SEISMIC STREAMER CABLE ; SEISMIC SURVEY METHOD

3629801 SEISMIC EXPLORATION IN THE VICINITY OF A SHORE AREA
OTHER KEYWORDS: SEISMIC RECORD PROCESSOR ; SEISMIC SURVEY METHOD

3746122 MULTI-DIRECTIONAL SEISMIC EXPLORATION METHODS
OTHER KEYWORDS: SEISMIC SURVEY METHOD

3775738 SELECTIVE SEQUENTIAL INPUT SWITCHING METHOD FOR SEISMIC SURVEYING
OTHER KEYWORDS: SEISMIC RECORD PROCESSOR , SEISMIC SURVEY METHOD

SEISMIC IMPLOSIVE ACOUSTIC TRANSMITTER

3584492 DEVICES FOR EMITTING ACOUSTIC WAVES IN A LIQUID MEDIUM

3610366 SYSTEM FOR MARINE SEISMIC EXPLORATION
OTHER KEYWORDS: SEISMIC EXPLOSIVE ACOUSTIC TRANSMITTER

3642089 MARINE IMPLoder-TYPE ACOUSTIC IMPULSE GENERATOR

3642090 MARINE IMPLoder-TYPE ACOUSTIC IMPULSE GENERATOR

3670839 EXTENDED AREA ACOUSTIC IMPULSE GENERATOR

3679021 ACOUSTIC PULSE GENERATING SYSTEM

3712408 METHOD OF AND APPARATUS FOR CREATING A SHOCK WAVE
BENEATH THE SURFACE OF A BODY OF WATER

3721311 MARINE SEISMIC SOURCE EMPLOYING THE WATER-HAMMER EFFECT

3741333 GENERATORS OF FLUID WAVE TRAINS
3770080 DEVICE FOR GENERATING ACOUSTIC WAVES BY IMPLOSION

SEISMIC RECORD PROCESSOR

3629800 GATED DECONVOLUTION REVERBERATION REMOVAL
3629801 SEISMIC EXPLORATION IN THE VICINITY OF A SHORE AREA
OTHER KEYWORDS: SEISMIC HYDROPHONE ARRAY ; SEISMIC SURVEY METHOD
3644002 MARINE ACOUSTIC VELOCITY PROFILING
OTHER KEYWORDS: SEISMIC SURVEY METHOD
3775738 SELECTIVE SEQUENTIAL INPUT SWITCHING METHOD FOR SEISMIC SURVEYING
OTHER KEYWORDS: SEISMIC HYDROPHONE ARRAY ; SEISMIC SURVEY METHOD

SEISMIC STREAMER CABLE

3695257 VACUUM FILLING PROCESS AND SYSTEM FOR LIQUID-FILLED MARINE
SEISMIC CABLES
3695674 UNDERWATER CABLE CONTROLLER
OTHER KEYWORDS: TOWED BODY DEPTH CONTROL
3611975 DATAWAVE DEVICE
OTHER KEYWORDS: DEPTH PRESSURE MEASUREMENT ;
TOWED BODY DEPTH CONTROL
3613071 SIMULTANEOUS DUAL SEISMIC STREAM CONFIGURATION FOR DETERMINING DATA
PROCESSING OF EXTENSIVE SEISMIC DATA. OTHER KEYWORDS:
SEISMIC HYDROPHONE ARRAY ; SEISMIC SURVEY METHOD
3646642 COMMUNICATION CHANNELS BETWEEN BOAT AND MARINE CABLE DEPTH CONTROLLERS
OTHER KEYWORDS: TOWED BODY DEPTH CONTROL
3649256 HYDROPHONE STREAMER CABLE ACOUSTIC DECOUPLER
3659257 CONTINUOUS MAGNETIC LINE HYDROPHONE
OTHER KEYWORDS: SEISMIC HYDROPHONE
3673556 TWO-LEVEL DEPTH CONTROLLERS FOR SEISMIC STREAMER CABLES
OTHER KEYWORDS: TOWED BODY DEPTH CONTROL
3675193 HOOP STRESSED BEAM HYDROPHONE
OTHER KEYWORDS: SEISMIC HYDROPHONE
3689675 FLEXIBLE GEOPHONE
OTHER KEYWORDS: SEISMIC HYDROPHONE
3696329 MARINE STREAMER CABLE
3699237 BUOYANT ELECTRIC CABLE
OTHER KEYWORDS: INSTRUMENT CABLE
3704681 VARIABLE DEPTH, REMOTELY SELECTIVE SEISMIC CABLE DEPTH CONTROLLER
OTHER KEYWORDS: TOWED BODY DEPTH CONTROL
3710006 MARINE STREAMER CABLE
3713084 METHOD OF POLARITY DETERMINATION OF MARINE HYDROPHONE STREAMERS
3713085 ACOUSTIC WAVE RECEIVER FOR UNDERWATER SEISMIC PROSPECTING
3744016 FOAM SEISMIC STREAMER

3774570 NON-ROTATING DEPTH CONTROLLED PARAVANE FOR SEISMIC CABLES
OTHER KEYWORDS: DEPTH PRESSURE MEASUREMENT ;
TOWED BODY DEPTH CONTROL

3775737 DEVICE FOR SENSING PRESSURE IN A LIQUID MEDIUM
OTHER KEYWORDS: SEISMIC HYDROPHONE

3781778 MARINE STREAMER CABLE

SEISMIC SURVEY METHOD

3572462 APPARATUS FOR AND METHOD OF SEISMIC EXPLORATION
OTHER KEYWORDS: SEISMIC EXPLOSIVE ACOUSTIC TRANSMITTER ;
SEISMIC HYDROPHONE

3578101 CHARGE LOADER DEVICE, SYSTEM, AND METHOD
FOR UNDERWATER SEISMIC EXPLORATION, OTHER KEYWORDS:
SEISMIC EXPLOSIVE ACOUSTIC TRANSMITTER

3581273 MARINE SEISMIC EXPLORATION
OTHER KEYWORDS: SEISMIC HYDROPHONE ARRAY

3602878 METHOD AND APPARATUS FOR GENERATING ENHANCED ACOUSTIC WAVES
OTHER KEYWORDS: SEISMIC ACOUSTIC TRANSMITTER ARRAY ;
SEISMIC EXPLOSIVE ACOUSTIC TRANSMITTER

3613071 SIMULTANEOUS DUAL SEISMIC SPREAD CONFIGURATION FOR DETERMINING DATA
PROCESSING OF EXTENSIVE SEISMIC DATA, OTHER KEYWORDS:
SEISMIC HYDROPHONE ARRAY ; SEISMIC STREAMER CABLE

3622970 METHOD OF SEISMIC PROSPECTING

3629801 SEISMIC EXPLORATION IN THE VICINITY OF A SHORE AREA
OTHER KEYWORDS: SEISMIC HYDROPHONE ARRAY ; SEISMIC RECORD PROCESSOR

3644882 MARINE ACOUSTIC VELOCITY PROFILING
OTHER KEYWORDS: SEISMIC RECORD PROCESSOR

3718206 AMPHIBIOUS SEISMIC EXPLORATION VEHICLE AND METHOD
OTHER KEYWORDS: SEISMIC EXPLOSIVE ACOUSTIC TRANSMITTER ;
SEISMIC VIBRATORY ACOUSTIC TRANSMITTER

3736554 SEISMIC EXPLORATION

3744021 OFFSHORE SEISMIC EXPLORATION METHOD

3746122 MULTI-DIRECTIONAL SEISMIC EXPLORATION METHODS
OTHER KEYWORDS: SEISMIC HYDROPHONE ARRAY

3775738 SELECTIVE SEQUENTIAL INPUT SWITCHING METHOD FOR SEISMIC SURVEYING
OTHER KEYWORDS: SEISMIC HYDROPHONE ARRAY ; SEISMIC RECORD PROCESSOR

SEISMIC VIBRATORY ACOUSTIC TRANSMITTER

3676840 UNDERWATER SEISMIC ACOUSTIC ENERGY SIGNAL SOURCE

3691516 ACOUSTIC PULSE GENERATOR UTILIZING A MECHANISM
FOR CHANGING THE NATURAL FREQUENCY OF OSCILLATION
OTHER KEYWORDS: TOWED VEHICLE

3718206 AMPHIBIOUS SEISMIC EXPLORATION VEHICLE AND METHOD
OTHER KEYWORDS: SEISMIC EXPLOSIVE ACOUSTIC TRANSMITTER ;
SEISMIC SURVEY METHOD

SLOPE PROTECTION

- 3561219 TEXTILE MAT FOR INDUSTRIAL USE IN THE FIELD OF CIVIL ENGINEERING
OTHER KEYWORDS: FABRIC MAT ; SEABED SCOUR PROTECTION
- 3563037 MINIMIZING SCOURING ACTION IN WATER FLOW CHANNELS
OTHER KEYWORDS: FABRIC MAT ; SEABED SCOUR PROTECTION
- 3570254 METHOD AND MEANS FOR PROTECTING AN EARTH SURFACE AGAINST SCOUR
OTHER KEYWORDS: CONCRETE FORM ; FABRIC MAT ;
LOW-COST SHORE PROTECTION ; REVETMENT
- 3597928 EROSION CONTROL
OTHER KEYWORDS: CONCRETE BLOCK ; FABRIC MAT ;
LOW-COST SHORE PROTECTION ; REVETMENT
- 3625014 METHOD AND APPARATUS FOR UNDERWATER DEPOSITION OF SETTABLE MATERIALS
OTHER KEYWORDS: ASPHALT ; CONCRETE FORM ; SEABED MATERIAL PLACEMENT
- 3696623 WOVEN MAT
OTHER KEYWORDS: FABRIC MAT ; WAVE ABSORBER BEACH
- 3699686 BOTTOM AND BANK FACING MATTRESS
OTHER KEYWORDS: FABRIC MAT ; SEABED SCOUR PROTECTION

SMALL-CRAFT LAUNCHER

- 3579996 PORTABLE BOAT RAMP
- 3587874 BOAT-SUPPORTING AND LAUNCHING DEVICE
- 3640413 BOAT CRANE
- 3734046 FLOATING DRY DOCK
OTHER KEYWORDS: SMALL-CRAFT SERVICE STRUCTURE
- 3747779 BOAT RAMP

SMALL-CRAFT MOORING DEVICE

- 3570256 INFLATABLE BERTH
OTHER KEYWORDS: FOULING PREVENTION
- 3603276 FLOTATION DOCKING FACILITY FOR SMALL CRAFT
OTHER KEYWORDS: SMALL-CRAFT SERVICE STRUCTURE
- 3659545 OUTRIGGER FOR MOORING A WATER VEHICLE
- 3680160 FLOAT FOR SEAMARKS, BUOYS, PONTOONS AND THE LIKE
OTHER KEYWORDS: BUOY MOORING SYSTEM ; ICE PROTECTION ; PIER, FLOATING
- 3695209 VESSEL MOORING DEVICES
- 3763816 AUTOMATIC DOCKING SYSTEM
- 3780690 LINE-POST COUPLINGS AND MARINE MOORING, TOWING DEVICES

SMALL-CRAFT PIER

- 3559762 SAFETY LADDER FOR WATER USE
OTHER KEYWORDS: PIER, FLOATING
- 3568451 PORTABLE DOCK
OTHER KEYWORDS: PIER, FIXED ; PIER, MOBILE
- 3572045 PIER ASSEMBLY
OTHER KEYWORDS: PIER FENDER ; PIER, FIXED ; PIER, MOBILE ; TIRES

3580202 FLOATING WHARF STRUCTURE
OTHER KEYWORDS: PIER, FLOATING

3602925 FLOATING SWIMMING POOL
OTHER KEYWORDS: PIER, FLOATING

3614871 METHOD, APPARATUS, AND DOCK MEMBER COMPONENTS FOR ERECTING, ALIGNING, REALIGNING, OR DISASSEMBLING A DOCK MEMBER. OTHER KEYWORDS: REFERENCE CONSTRUCTION ; PIER, FIXED ; PIER, MOBILE

3616774 FLOATING DOCK STRUCTURE
OTHER KEYWORDS: PIER, FLOATING

3620027 DOCK STRUCTURE
OTHER KEYWORDS: PIER, FIXED ; PIER, FLOATING

3636908 MOBILE DOCK FOR SMALL CRAFT
OTHER KEYWORDS: PIER, FLOATING ; PIER, MOBILE

3643448 FLOATING LANDING STAGES
OTHER KEYWORDS: PIER, FLOATING

3654885 FLOATING DOCK SECTION
OTHER KEYWORDS: PIER, FLOATING

3655543 MONOLITHIC FLOATING WHARVES
OTHER KEYWORDS: PIER, FLOATING

3662559 ANCHORAGE FOR BOAT DOCKS
OTHER KEYWORDS: PIER, FLOATING ; PILE FOOTING ; SANDBAG ; SEABED FOUNDATION

3672178 ROTARY DOCK
OTHER KEYWORDS: PIER, FLOATING

3673976 SECTIONALIZED PONTOON APPARATUS
OTHER KEYWORDS: PIER, FLOATING

3683838 MOORING DEVICE FOR FLOATING BOAT HOIST
OTHER KEYWORDS: PIER, FLOATING ; SMALL CRAFT SERVICE STRUCTURE

3686876 REMOVABLE TIER CONSTRUCTION
OTHER KEYWORDS: PIER, FIXED ; PIER, MOBILE ; SEABED FOUNDATION

3695207 ANCHORAGE FOR BOAT DOCK, BUOY OR THE LIKE
OTHER KEYWORDS: BUOY MOORING SYSTEM ; PIER, FLOATING

3703960 MARINE SEWAGE COLLECTION AND DISCHARGE SYSTEMS
OTHER KEYWORDS: POLLUTANT COLLECTION ; PUMP ; SMALL-CRAFT SERVICE STRUCTURE

3726098 MODULAR DOCK FLOAT
OTHER KEYWORDS: PIER, FLOATING

3747354 RETRACTABLE PIER
OTHER KEYWORDS: PIER, FIXED ; PIER, MOBILE

3752102 FLOATING DOCK OR THE LIKE AND FLOATATION UNIT FOR USE THEREWITH
OTHER KEYWORDS: PIER, FLOATING

3760754 MODULAR UNIT FOR A FLOATING DOCK SYSTEM
OTHER KEYWORDS: PIER, FLOATING

3763808 UNIVERSAL MARINE MODULE
OTHER KEYWORDS: PIER, FLOATING

3773132 MODULAR CONCRETE FLOTATION UNIT
OTHER KEYWORDS: PIER, FLOATING

SMALL-CRAFT SERVICE STRUCTURE

3552424 FLOATING LIFT STATION
OTHER KEYWORDS: PIER, FLOATING ; POLLUTANT COLLECTION

3561391 BOAT WASHING APPARATUS AND METHOD

3603276 FLOTATION DOCKING FACILITY FOR SMALL CRAFT
OTHER KEYWORDS: SMALL-CRAFT MOORING DEVICE

3663838 MOORING DEVICE FOR FLOATING BOAT HOIST
OTHER KEYWORDS: PIER, FLOATING ; SMALL-CRAFT PIER

3703360 MARINE SEWAGE COLLECTION AND DISCHARGE SYSTEMS
OTHER KEYWORDS: POLLUTANT COLLECTION ; PUMP ; SMALL-CRAFT PIER

3709184 METHOD AND APPARATUS FOR CLEANING VESSELS AFLOAT
OTHER KEYWORDS: FOULING REMOVAL

3727415 BOAT DRY DOCKING DEVICE

3731761 FLOATING PIER WITH SELF ADJUSTING STAIRWAY ASSEMBLY
OTHER KEYWORDS: PIER, FLOATING

3734046 FLOATING DRY DOCK
OTHER KEYWORDS: SMALL-CRAFT LAUNCHER

3753355 LIFTING DRY DOCK

3773059 JET CLEANING APPARATUS FOR BOATS
OTHER KEYWORDS: FOULING REMOVAL

3777691 MARINE ELEVATOR

3827090 INDIVIDUAL DRY DOCK FOR BOATS

SONAR, DEPTH SOUNDER

3564490 METHOD AND MEANS FOR MEASURING DEPTH OF WATER OR THE LIKE

3588795 DEPTH INDICATOR

3617396 SCOUR DETECTION AT BRIDGE PIERS AND THE LIKE
OTHER KEYWORDS: SEABED SCOUR PROTECTION ; SEDIMENTATION MEASUREMENT

3624596 ULTRASONIC RANGE, ATTENUABLE DEPTH, MEASURING SYSTEM

3629813 METHOD AND APPARATUS FOR ECHO-SOUNDING OF SHORT DISTANCES

3641484 CONTOUR, MAPPING SYSTEM

3669540 OPTICAL DEPTH FINDER AND ELEMENTS THEREFOR
OTHER KEYWORDS: INSTRUMENT, AIRBORNE ; INSTRUMENT, LASER

3673554 DEPTH SOUNDER DIGITIZER

3681747 SEA BOTTOM SLOPE MEASURING APPARATUS

3683324 DEPTH METER HAVING IMPROVED TIME VARYING GAIN CONTROL

3696326 DEPTH SOUNDER DIGITIZER

3710310 SYSTEM FOR DETERMINING DEPTH OF WATER

3727178 ECHO SOUNDING DISTANCE MEASUREMENT METHOD AND APPARATUS

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3733582 DIGITAL DEPTH SOUNDER
 3739325 METHOD AND DEVICE FOR EVALUATING ECHO SIGNALS
 WITH ECHO SOUNDING SYSTEMS HAVING DIGITAL INDICATION
 3742435 FATHOMETER MEANS AND METHOD
 3757287 SEA BOTTOM CLASSIFIER
 OTHER KEYWORDS: SEABED PROPERTY MEASUREMENT

SONAR, SIDE LOOKING

3585579 SIDE LOOKING SONAR TRANSDUCER
 3715824 SIDE LOOKING SONAR APPARATUS
 3716825 CONTOUR MEASURING APPARATUS ESPECIALLY FOR USE
 IN A SEA BOTTOM ELEVATION MEASUREMENT
 3742436 SIDE LOOKING SONAR APPARATUS
 3781775 ROTATING STEREO SONAR MAPPING AND POSITIONING SYSTEM
 OTHER KEYWORDS: INSTRUMENT DEPLOYMENT ; SEABED SITE SURVEY

STRUCTURE INSPECTION

3562517 APPARATUS FOR MEASURING IRREGULAR SURFACES OF DEPOSITS
 OF CONCRETE BLOCKS OR RUBBLE MOUNDS. OTHER KEYWORDS:
 BREAKWATER, RUBBLE ; CONCRETE ARMOR UNIT ; SEABED SITE SURVEY
 3673407 RADIOGRAPHIC APPARATUS FOR UNDERWATER INSPECTION OF WOODEN PILING
 OTHER KEYWORDS: INSTRUMENT, RADIOISOTOPE ; PILE, WOOD
 3735129 METHOD FOR LOCATING THE POSITION OF MEMBERS RELATIVE TO EACH OTHER
 OTHER KEYWORDS: INSTRUMENT, RADIOISOTOPE

STRUCTURE REPAIR

3597930 METHOD AND APPARATUS FOR REINFORCING IN SITU IN PILE CASING
 OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, LEG ;
 PILE, CONCRETE ; PILE, STEEL
 3602000 REINFORCED STEEL PIPE PILING STRUCTURE
 OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, LEG ;
 PILE, CONCRETE ; PILE, STEEL
 3690110 REPAIRING OR REHABILITATING STEEL SUPPORTED H-PILES
 OTHER KEYWORDS: CONCRETE FORM ; PILE, STEEL
 3720068 METHOD AND APPARATUS FOR SPLICING REPLACEMENT PILE SECTION
 TO PILE STUB
 OTHER KEYWORDS: PILE SECTION CONNECTION ; PILE, WOOD
 3726950 METHOD FOR PRODUCING SUB-AQUEOUS AND OTHER CAST-IN-PLACE CONCRETE
 STRUCTURES IN SITU
 OTHER KEYWORDS: BREAKWATER, CONCRETE ; BULKHEAD ; CONCRETE FORM ;
 FABRIC MAT ; OFFSHORE CONSTRUCTION ; PILE CONCRETE
 3728864 APPARATUS FOR REPAIRING STEEL SUPPORTING PILES
 OTHER KEYWORDS: CONCRETE FORM ; PILE, STEEL
 3766879 APPARATUS FOR COATING UNDER WATER
 OTHER KEYWORDS: COATING ; CORROSION PREVENTION ; FOULING PREVENTION
 3768265 COFFERDAM
 OTHER KEYWORDS: COFFERDAM ; PILE, SHEET ; PILE, STEEL

3780975 MEANS FOR PRODUCING CAST-IN-PLACE STRUCTURES IN SITU
OTHER KEYWORDS: CONCRETE FORM ; FABRIC MAT ; OFFSHORE CONSTRUCTION

RE27460 METHOD FOR ENCASING RIGID MEMBERS WITH CONCRETE
OTHER KEYWORDS: CONCRETE FORM ; PILE PROTECTION

TIDAL ESTUARY WATER LEVEL

3733830 TIDAL FLOW SYSTEM AND METHOD FOR CAUSING WATER
TO FLOW THROUGH WATERWAYS. OTHER KEYWORDS: CHANNEL BARRIER ;
TIDAL ESTUARY WATER QUALITY

3756032 SLUICEGATE STRUCTURE
OTHER KEYWORDS: CHANNEL BARRIER ; TIDAL INLET

TIDAL ESTUARY WATER QUALITY

3632508 METHOD AND APPARATUS FOR DESILTING AND DESALTING BODIES OF WATER
OTHER KEYWORDS: CHANNEL BARRIER ; CHANNEL PROTECTION ; TIDAL INLET

3667234 REDUCING AND RETARDING VOLUME AND VELOCITY OF A LIQUID FREE-FLOWING
IN ONE DIRECTION. OTHER KEYWORDS: CHANNEL BARRIER ; TIDAL INLET

3713298 NAVIGABLE DAM
OTHER KEYWORDS: CHANNEL BARRIER ; TIDAL INLET

3733830 TIDAL FLOW SYSTEM AND METHOD FOR CAUSING WATER
TO FLOW THROUGH WATERWAYS. OTHER KEYWORDS: CHANNEL BARRIER ;
TIDAL ESTUARY WATER LEVEL

TIDAL INLET

3565491 JET PUMP METHOD AND SYSTEM
OTHER KEYWORDS: CHANNEL PROTECTION ; DREDGE-SPOIL MEASUREMENT ;
DREDGE-SPOIL TRANSPORT ; DREDGE, SUCTION ; PUMP

3632508 METHOD AND APPARATUS FOR DESILTING AND DESALTING BODIES OF WATER
OTHER KEYWORDS: CHANNEL BARRIER ; CHANNEL PROTECTION ;
TIDAL ESTUARY WATER QUALITY

3638432 STATIONARY DREDGING APPARATUS
OTHER KEYWORDS: CHANNEL PROTECTION ; DREDGE, SUCTION

3667234 REDUCING AND RETARDING VOLUME AND VELOCITY OF A LIQUID FREE-FLOWING
IN ONE DIRECTION. OTHER KEYWORDS: CHANNEL BARRIER ;
TIDAL ESTUARY WATER QUALITY

3713298 NAVIGABLE DAM
OTHER KEYWORDS: CHANNEL BARRIER ; TIDAL ESTUARY WATER QUALITY

3756032 SLUICEGATE STRUCTURE
OTHER KEYWORDS: CHANNEL BARRIER ; TIDAL ESTUARY WATER LEVEL

TIDE MEASUREMENT

3552209 LIQUID LEVEL INDICATORS

TIRES

3572045 PIER ASSEMBLY
OTHER KEYWORDS: PIER FENDER ; PIER, FIXED ; PIER, MOBILE ;
SMALL-CRAFT PIER

TOW WINCH CONTROL

- 3596070 WINCH CONTROL SYSTEM FOR CONSTANT LOAD DEPTH
OTHER KEYWORDS: TOWED BODY DEPTH CONTROL
- 3604387 MEANS FOR LAUNCHING, TOWING AND RECOVERING
AN OCEANOGRAPHIC TOWED BODY IN A SEAWAY
OTHER KEYWORDS: INSTRUMENT DEPLOYMENT ; INSTRUMENT RETRIEVAL

TOWED BODY DEPTH CONTROL

- 3560912 CONTROL SYSTEM FOR A TOWED VEHICLE
OTHER KEYWORDS: TOWED VEHICLE
- 3596070 WINCH CONTROL SYSTEM FOR CONSTANT LOAD DEPTH
OTHER KEYWORDS: TOW WINCH CONTROL
- 3603426 APPARATUS FOR MARINE SEISMOGRAPHIC PROSPECTING
OTHER KEYWORDS: SEISMIC EXPLOSIVE ACOUSTIC TRANSMITTER
- 3605674 UNDERWATER CABLE CONTROLLER
OTHER KEYWORDS: SEISMIC STREAMER CABLE
- 3611975 PARAVANE DEVICE
OTHER KEYWORDS: DEPTH PRESSURE MEASUREMENT ; SEISMIC STREAMER CABLE
- 3648642 COMMUNICATION CHANNEL BETWEEN BOAT AND MARINE CABLE
DEPTH CONTROLLERS. OTHER KEYWORDS: SEISMIC STREAMER CABLE
- 3673556 TWO-LEVEL DEPTH CONTROLLERS FOR SEISMIC STREAMER CABLES
OTHER KEYWORDS: SEISMIC STREAMER CABLE
- 3688730 TOWABLE UNDERWATER VESSEL
OTHER KEYWORDS: TOWED VEHICLE
- 3704681 VARIABLE DEPTH, REMOTELY SELECTIVE SEISMIC CABLE DEPTH CONTROLLER
OTHER KEYWORDS: SEISMIC STREAMER CABLE
- 3760761 UNDERWATER KITE DEVICE
OTHER KEYWORDS: TOWED VEHICLE
- 3774570 NON-ROTATING DEPTH CONTROLLER PARAVANE FOR SEISMIC CABLES
OTHER KEYWORDS: DEPTH PRESSURE MEASUREMENT ; SEISMIC STREAMER CABLE

TOWED VEHICLE

- 3560912 CONTROL SYSTEM FOR A TOWED VEHICLE
OTHER KEYWORDS: TOWED BODY DEPTH CONTROL
- 3638601 ACOUSTICALLY TRANSPARENT HYDRODYNAMIC TOWED BODY
FOR UNDERWATER EXPLORATION AND THE LIKE
- 3688730 TOWABLE UNDERWATER VESSEL
OTHER KEYWORDS: TOWED BODY DEPTH CONTROL
- 3691516 ACOUSTIC PULSE GENERATOR UTILIZING A MECHANISM
FOR CHANGING THE NATURAL FREQUENCY OF OSCILLATION
OTHER KEYWORDS: SEISMIC VIBRATORY ACOUSTIC TRANSMITTER
- 3744020 MARINE SEISMIC SOURCE
OTHER KEYWORDS: SEISMIC EXPLOSIVE ACOUSTIC TRANSMITTER
- 3746123 METHOD OF AND SYSTEM FOR REDUCING SECONDARY PRESSURE PULSES
IN OPERATION OF PNEUMATIC SOUND SOURCE IN WATER
OTHER KEYWORDS: SEISMIC EXPLOSIVE ACOUSTIC TRANSMITTER

3760761 UNDERWATER KITE DEVICE
OTHER KEYWORDS: TOWED BODY DEPTH CONTROL

3774564 OCEANOGRAPHIC VEHICLE AND PLATFORM
OTHER KEYWORDS: BUOY, INSTRUMENTED

TOWING CABLES

3611476 LOW-DRAW FAIRING CONFIGURATION FOR FLEXIBLE TOWING CABLES

3613627 HIGH SPEED FAIRER TOWING CABLE

3648226 VIBRATION ISOLATION MODULE FOR TOWED CABLES

3712261 FAIRING

WATER PLANT REMOVAL

3599354 APPARATUS FOR REMOVING WEEDS FROM SOIL UNDER WATER

3605296 AMPHIBIOUS DITCH EXCAVATOR
OTHER KEYWORDS: DREDGE, CUTTERHEAD ; DREDGE PROPULSION

3637080 METHOD OF AND APPARATUS FOR SKIMMING FLOTSAM FROM THE SURFACE
OF A BODY OF WATER. OTHER KEYWORDS: POLLUTANT, MECHANICAL REMOVAL ;
POLLUTANT REMOVAL WATERCRAFT

3706185 APPARATUS FOR REMOVING MARINE GROWTHS AND ROOTS
OTHER KEYWORDS: POLLUTANT, MECHANICAL REMOVAL ;
POLLUTANT REMOVAL WATERCRAFT

3738029 DREDGING HEAD WITH PIVOTALLY MOUNTED MUD SHIELD
OTHER KEYWORDS: DREDGE, CUTTERHEAD ; DREDGE INTAKE

3777375 SUCTION DREDGE WITH BRUSH CUTTING ATTACHMENT
OTHER KEYWORDS: DREDGE, CUTTERHEAD ; DREDGE LADDER CONTROL

WAVE ABSORBER BEACH

3653216 METHOD AND APPARATUS FOR PREVENTING EROSION
OTHER KEYWORDS: BREAKWATER, CONCRETE

3696623 WOVEN MAT
OTHER KEYWORDS: FABRIC MAT ; SLOPE PROTECTION

3733831 METHOD AND APPARATUS FOR PREVENTING EROSION AND FOR CONVEYING
OTHER KEYWORDS: BREAKWATER, CONCRETE ; SEABED FOUNDATION

WAVE FLUME

3557559 WAVE-GENERATING APPARATUS
OTHER KEYWORDS: WAVE GENERATOR

3629958 INTERNAL AND SURFACE WAVE SIMULATOR TANK
OTHER KEYWORDS: WAVE GENERATOR

3633419 EXPERIMENTAL BASIN AND MEANS FOR TESTING BEHAVIORS
OF OFFSHORE MARINE STRUCTURES
OTHER KEYWORDS: HYDRAULIC MODEL BASIN

3693195 APPARATUS FOR SURF GENERATION
OTHER KEYWORDS: WAVE GENERATOR

WAVE GENERATOR

3557559 WAVE-GENERATING APPARATUS
OTHER KEYWORDS: WAVE FLUME

3629958 INTERNAL AND SURFACE WAVE SIMULATOR TANK
OTHER KEYWORDS: WAVE FLUME

3693195 APPARATUS FOR SURF GENERATION
OTHER KEYWORDS: WAVE FLUME

WAVE MEASUREMENT

3587308 WATER WAVE MONITOR

3587309 AERO-HYDRO INTERFACE MEASURING SYSTEM
OTHER KEYWORDS: INSTRUMENT, TOWED

3610038 WAVE METER
OTHER KEYWORDS: BUOY, INSTRUMENTED

3610039 DUCTED WAVE METER

3656342 WATER WAVE FOLLOWER
OTHER KEYWORDS: WIND MEASUREMENT

3765236 APPARATUS FOR RECORDING SWELL FREQUENCY AND PROPAGATION DIRECTION
OF WAVES. OTHER KEYWORDS: BUOY, INSTRUMENTED

3769838 WAVE MEASURING APPARATUS
OTHER KEYWORDS: BUOY, INSTRUMENTED

WIND MEASUREMENT

3656342 WATER WAVE FOLLOWER
OTHER KEYWORDS: WAVE MEASUREMENT

WOOD PRESERVATIVE

3679466 REPELLING OF MARINE ANIMAL PESTS
OTHER KEYWORDS: FOULING PREVENTION

<p>Ray, Robert E.</p> <p>An annotated bibliography of patents related to coastal engineering / by Robert E. Ray, Michael D. Dickey, and Annie M. Lyles. - Ft. Belvoir, Va. : U.S. Coastal Engineering Research Center ; Springfield, Va. : available from National Technical Information Service, 1979. 3 v. : 27 cm. - (Miscellaneous report - U.S. Coastal Engineering Research Center ; no. 79-6)</p> <p>CONTENTS: v.1. 1967-70. - v.2. 1971-73. - v.3. 1974-76.</p> <p>Report presents a collection of patents on coastal engineering issued by the U.S. Patent Office from 1967 to 1976. Abstracts and annotations for 2,468 patents are given in three volumes. Each volume includes a list of patent titles and numbers with a keyword index. Vol. I gives explanatory information on the collection and use of patents.</p> <p>1. Coastal engineering - Patents. 2. Patents - Bibliography. I. Title. II. Dickey, Michael D. III. Series: U.S. Coastal Engineering Research Center. Miscellaneous report no. 79-6.</p> <p>TC203 .U581mr no. 79-6 Appendix 627</p>	<p>Ray, Robert E.</p> <p>An annotated bibliography of patents related to coastal engineering / by Robert E. Ray, Michael D. Dickey, and Annie M. Lyles. - Ft. Belvoir, Va. : U.S. Coastal Engineering Research Center ; Springfield, Va. : available from National Technical Information Service, 1979. 3 v. : 27 cm. - (Miscellaneous report - U.S. Coastal Engineering Research Center ; no. 79-6)</p> <p>CONTENTS: v.1. 1967-70. - v.2. 1971-73. - v.3. 1974-76.</p> <p>Report presents a collection of patents on coastal engineering issued by the U.S. Patent Office from 1967 to 1976. Abstracts and annotations for 2,468 patents are given in three volumes. Each volume includes a list of patent titles and numbers with a keyword index. Vol. I gives explanatory information on the collection and use of patents.</p> <p>1. Coastal engineering - Patents. 2. Patents - Bibliography. I. Title. II. Dickey, Michael D. III. Series: U.S. Coastal Engineering Research Center. Miscellaneous report no. 79-6.</p> <p>TC203 .U581mr no. 79-6 Appendix 627</p>
<p>Ray, Robert E.</p> <p>An annotated bibliography of patents related to coastal engineering / by Robert E. Ray, Michael D. Dickey, and Annie M. Lyles. - Ft. Belvoir, Va. : U.S. Coastal Engineering Research Center ; Springfield, Va. : available from National Technical Information Service, 1979. 3 v. : 27 cm. - (Miscellaneous report - U.S. Coastal Engineering Research Center ; no. 79-6)</p> <p>CONTENTS: v.1. 1967-70. - v.2. 1971-73. - v.3. 1974-76.</p> <p>Report presents a collection of patents on coastal engineering issued by the U.S. Patent Office from 1967 to 1976. Abstracts and annotations for 2,468 patents are given in three volumes. Each volume includes a list of patent titles and numbers with a keyword index. Vol. I gives explanatory information on the collection and use of patents.</p> <p>1. Coastal engineering - Patents. 2. Patents - Bibliography. I. Title. II. Dickey, Michael D. III. Series: U.S. Coastal Engineering Research Center. Miscellaneous report no. 79-6.</p> <p>TC203 .U581mr no. 79-6 Appendix 627</p>	<p>Ray, Robert E.</p> <p>An annotated bibliography of patents related to coastal engineering / by Robert E. Ray, Michael D. Dickey, and Annie M. Lyles. - Ft. Belvoir, Va. : U.S. Coastal Engineering Research Center ; Springfield, Va. : available from National Technical Information Service, 1979. 3 v. : 27 cm. - (Miscellaneous report - U.S. Coastal Engineering Research Center ; no. 79-6)</p> <p>CONTENTS: v.1. 1967-70. - v.2. 1971-73. - v.3. 1974-76.</p> <p>Report presents a collection of patents on coastal engineering issued by the U.S. Patent Office from 1967 to 1976. Abstracts and annotations for 2,468 patents are given in three volumes. Each volume includes a list of patent titles and numbers with a keyword index. Vol. I gives explanatory information on the collection and use of patents.</p> <p>1. Coastal engineering - Patents. 2. Patents - Bibliography. I. Title. II. Dickey, Michael D. III. Series: U.S. Coastal Engineering Research Center. Miscellaneous report no. 79-6.</p> <p>TC203 .U581mr no. 79-6 Appendix 627</p>